

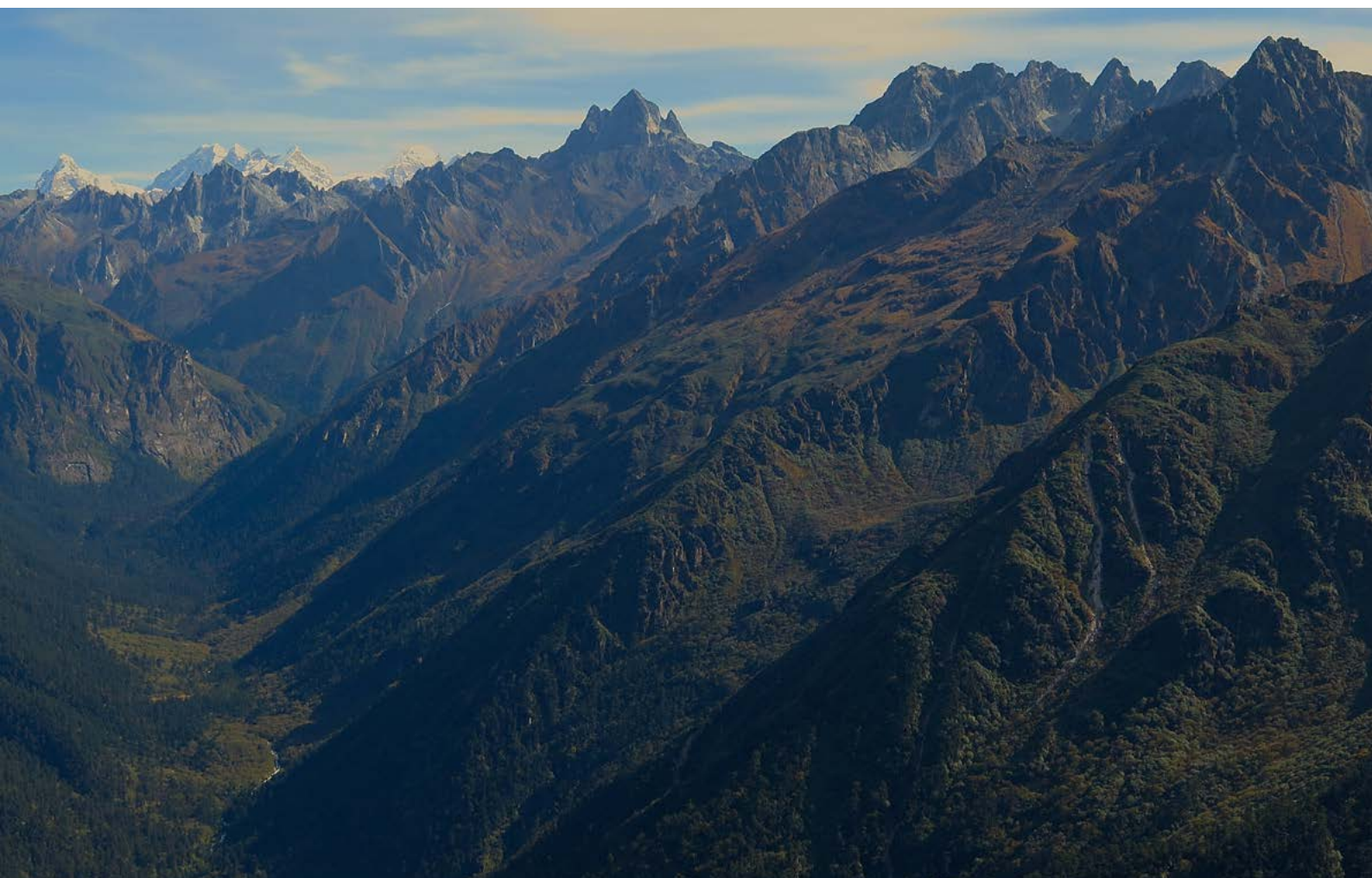


# Leveraging the World Heritage Convention for conservation in the Hindu Kush Himalaya

An independent assessment of natural World Heritage potential

Tilman Jaeger

With contributions by Nakul Chettri, Sunita Chaudhary and Kabir Uddin



INTERNATIONAL UNION FOR CONSERVATION OF NATURE



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IUCN is pleased to acknowledge the support of its Framework Partners who provide core funding: Ministry of Foreign Affairs of Denmark; Ministry for Foreign Affairs of Finland; Government of France and the French Development Agency (AFD); the Ministry of Environment, Republic of Korea; the Norwegian Agency for Development Cooperation (Norad); the Swedish International Development Cooperation Agency (Sida); the Swiss Agency for Development and Cooperation (SDC) and the United States Department of State.

Funding for this publication was provided by a grant from the National Geographic Society to Wild Heritage.

**Published by:** IUCN, Gland, Switzerland  
**Produced by:** IUCN World Heritage Programme in collaboration with IUCN-WCPA, ICIMOD and Wild Heritage  
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**Recommended citation:** Jaeger, T. (2021). *Leveraging the World Heritage Convention for conservation in the Hindu Kush Himalaya: An independent assessment of natural World Heritage potential*. Gland, Switzerland: IUCN.

**ISBN:** 978-2-8317-2168-2 (PDF)  
**DOI:** <https://doi.org/10.2305/IUCN.CH.2021.18.en>

**Cover photo:** Aerial view of Khangchendzonga National Park in Sikkim, India. Inscribed in 2016 as the first mixed World Heritage site in the region for its extraordinary cultural and natural values, the property is an integral part of the Kangchenjunga Landscape, one of the Transboundary Landscapes prioritised and promoted by ICIMOD. The national park is contiguous with the Kangchenjunga Conservation Area in Nepal. The peak of Khangchendzonga / Kangchenjunga, the world's third highest mountain, is shared by India and Nepal. ©IUCN/Tilman Jaeger

**Layout by:** Guilder Design, Dublin, Ireland ([www.guilderdesign.com](http://www.guilderdesign.com))

**Proofreading by:** Caroline Snow



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# Executive summary

The Himalaya proper is commonly defined as the rugged arc between the Tibetan Plateau and the Ganges Plain stretching from the Indus River in the northwest to the great bend of the Brahmaputra River (Yarlung Tsangpo) in the east. The Himalaya proper is the heart of a giant contiguous ridge of folds and upthrusts, sometimes referred to as High Asia. This assessment adopts the definition of the Hindu Kush Himalaya (HKH) region used by the International Centre for Integrated Mountain Development (ICIMOD). According to this definition, the region by far exceeds the Himalaya proper by comprising all or parts of 12 distinguishable mountain ranges, extending over some 3,500 kilometres from Afghanistan to Myanmar.

The natural and cultural wealth of the HKH region is as overwhelming as its scenic beauty. The same holds true for the region's enormous ecosystem services underpinning the livelihoods, food security and energy provision of a substantial part of the world's human population in the region itself and downstream along the numerous major rivers originating in it. Since time immemorial, the HKH region has been home to an extraordinary diversity of peoples, cultures, languages, religions and belief systems, intricately depending on, and interacting with, the mountain landscape and its resources. Sophisticated local and indigenous knowledge systems, practices and deep spirituality are among the results of this longstanding co-evolution. From an ecological perspective, the vast HKH region contains not only the highest vertical gradients anywhere on land, but also an unparalleled diversity of ecosystems and habitats along the enormous east–west and north–south gradients. Teeming with life in all its forms, the HKH region is a globally unique meeting point of four biodiversity hotspots, which to this day is still to reveal many of its biological secrets.

It is clear that such an exceptional region is of significant relevance to an intergovernmental agreement with the objective to identify and conserve the world's most precious cultural and natural heritage, the World Heritage Convention. While several World Heritage properties have been inscribed in the HKH region over the decades and others have been identified as promising candidate sites, no comprehensive and up-to-date situation analysis is currently available. Almost five decades into the life of the World Heritage Convention, it was considered high time to address this surprising information gap by taking stock of the past use and future potential of the Convention in the region. A partnership-based project was formed, bringing together the unique mandate and unmatched technical expertise of ICIMOD with the World Heritage role and expertise of the International Union for Conservation of Nature (IUCN), of which ICIMOD is a member. This assessment is the main product of this project, which convened the eight regional ICIMOD member countries, and neighbouring countries as applicable, in order to find common ground in terms of regional nature conservation priorities and how the Convention might best be used as leverage for their conservation, including beyond national borders.

This assessment is strictly technical in nature; it aims at shedding light on the regional potential of the Convention from a nature conservation perspective based on a literature review and expert consultation. An international workshop hosted by ICIMOD at its headquarters in Kathmandu served as an essential platform and sounding board. Incorporating further feedback from the participants of this workshop and additional selected reviewers, this assessment is to serve both as a stock-taking exercise and an inspiration for possible next steps.

The assessment offers an overview of the regional setting from a conservation perspective to set the stage. Both the inscribed World Heritage properties and the natural candidate sites on the so-called Tentative Lists of the ICIMOD member countries are then briefly presented and discussed. Reference is made to neighbouring countries when applicable, such as in the case of transboundary areas of major conservation interest beyond what ICIMOD defines as the HKH. The heart of the assessment systematically screens the literature for hints at regions and sites of possible World Heritage 'calibre', while also fully taking into account the rich discussions at the international workshop in Kathmandu. A synthesis and recommendations are offered as food for thought and a foundation for possible next steps. Furthermore, a bibliography, links to useful online resources and supplementary annexes are provided.

Due to the scale and heterogeneity of the region, a full appreciation of the nuances of this assessment requires reading the full text. Nonetheless, an attempt to synthesise is made below. Put simply, it is fair to say that the HKH region is biogeographically and ecologically without parallel due to its combination of magnitude, diversity and extremes. The landscape, ecosystem and habitat mosaic is reflected in, and intricately linked with, a similarly stunning ethnic and cultural diversity. Demographic change, economic growth, increasing demands from local to global levels, climate change and weak governance systems emerge as overarching drivers of change in recent and comprehensive analysis. Especially the peripheral and remote parts of the HKH are becoming increasingly attractive for resource extraction as the resources in more accessible locations become exhausted. The impacts from demands stemming from outside the region are ever more important, one dramatic example being hydropower development, often to meet demands outside of HKH. The region's exceptional conservation values coincide with exceptional threats and challenges, both in terms of culture and nature.

The assessment was able to unambiguously reaffirm that the HKH stands out globally for its exceptional natural and cultural wealth and diversity and that the World Heritage Convention clearly remains underutilised in the region. Entry points for a more systematic utilisation of the Convention are articulated in the following general conclusions and recommendations:

#### **Recommendation 1**

Systematically re-visit existing World Heritage properties in order to analyse options to consolidate and expand them through contiguous and/or serial extensions.

#### **Recommendation 2**

When re-visiting existing World Heritage properties, specifically consider options to engage in contiguous or serial extensions across national and sub-national borders, as applicable and feasible.

#### **Recommendation 3**

Systematically analyse options to bring together World Heritage and the ICIMOD Transboundary Landscape initiatives, using existing properties and sites on the Tentative Lists as anchors and seeds for more comprehensive and ambitious conservation efforts, where applicable.

In terms of natural World Heritage potential, the assessment identifies broad gaps and hints at potential sites, which deserve further analysis. It is clear that such information does not amount to an endorsement of the corresponding candidate sites by IUCN or other partners in this work, but rather should be regarded as a first step to trigger discussion and analysis according to the following recommendations:

#### **Recommendation 4**

Systematically consider the identified broad gaps when engaging in revisions of Tentative Lists or natural or mixed World Heritage initiatives in the region.

Broad gaps emerging as deserving further analysis include:

- The cold winter deserts of the HKH;
- both the Eastern and the Western Himalayan Broadleaf and Conifer Forests;
- the Meghalaya subtropical forests ecoregion;
- the Eastern Himalayan Alpine Shrub and Meadows (adjacent to the above-mentioned Eastern Himalayan Broadleaf and Conifer Forests);
- the parts of the forests of northern Myanmar overlapping with the HKH region, sometimes referred to as the Northern Triangle Subtropical Forests and the Northern Triangle Temperate Forests, respectively;
- A massive conservation complex comprised of six large protected areas in Afghanistan, China, Pakistan and Tajikistan with a joint area exceeding 3.3 million ha. The complex is the heart of ICIMOD's Hindu Kush Karakoram Pamir Landscape and likewise stands out as a possible World Heritage gap in the northwest of HKH deserving further analysis;
- Rivers are culturally, religiously and spiritually revered elements of the landscape in the HKH region, also serving as natural corridors. At a time of sharply increased hydropower development in the HKH, free-flowing rivers are becoming ever more rare. If any meaningful representations of untamed rivers of the world's highest mountain ranges and their biodiversity are to remain, effective conservation approaches are needed now, including under the Convention.

Another particularity of the region emerging from the analysis is what can be referred to as a 'geoheritage gap'. It is conspicuous that hardly any use has been made of natural World Heritage criterion (viii) in the region, sometimes referred to as the 'geological criterion'. This assessment did not focus on criterion (viii) and faced the challenge that very limited structured information is readily available on the region from the perspective of this particular criterion. The main recommendation in this regard is thus to address this specific information gap.

#### **Recommendation 5**

In recognition of the paucity of structured information assessing the regional potential under World Heritage criterion (viii), consider a thematic study for the region to initiate an overdue structured regional approach to geoheritage under the Convention.

Finally, multiple sites have emerged as areas deserving further analysis to confirm – or reject – possible World Heritage merits. While emphasising once more that the role of this assessment is not to endorse specific sites, it is hoped that the following list of candidate sites of potential World Heritage merits contributes to guiding the search in line with the final recommendation:

## Recommendation 6

Systematically consider all hints at candidate sites for new nominations and/or contiguous and/or serial extensions of existing properties.

Further analysis is needed in all cases, which will help to better understand World Heritage potential – or lack thereof:

- Khangchendzonga National Park in India is routinely described as a conservation gem with intricate links to several other areas of global conservation importance. From a technical perspective, the most obvious 'extension candidate' is the contiguous Kangchenjunga Conservation Area (Nepal). There are many nearby protected areas of highest conservation importance in Bhutan, China, India and Nepal.
- Sagarmatha National Park (Nepal) encompasses part of the world's highest mountain, a partial coverage following political borders rather than a conservation rationale. From a technical perspective, there is obvious potential for a more meaningful World Heritage coverage of the peak of our planet.
- The boundaries of several components of the Three Parallel Rivers of Yunnan Protected Areas (China) coincide with national and sub-national borders. While already a large and complex serial property, extensions into neighbouring Sichuan, Tibet Autonomous Region and/or Myanmar deserve analysis from a technical perspective.
- The various properties in China's Sichuan Province (Jiuzhaigou Valley Scenic and Historic Interest Area, Huanglong Scenic and Historic Interest Area, Sichuan Giant Panda Sanctuaries – Wolong, Mt Siguniang and Jiayin Mountains) are all embedded in much larger landscapes of highest conservation priority and could likely benefit from contiguous or serial extensions; the area may even enable new independent nominations. From a technical perspective, all options deserve further scrutiny.
- Manas Wildlife Sanctuary (India) is an existing property consistently emerging as an integral part of a larger landscape of highest conservation significance. While just on the margin of HKH, the area depends on the HKH, with which it is ecologically, hydrologically and culturally linked. The contiguous Royal Manas National Park in Bhutan would appear to be an obvious 'sister park' deserving further analysis.
- Chitwan National Park (Nepal) is part of a cluster of protected areas in Nepal and India in the Terai Lowlands sometimes described as the Terai Arc. Viable populations of the flagship species of the property, such as rhinos, elephants and tigers require conservation approaches beyond the relatively small national park. Consequently, a more ambitious World Heritage approach is to be recommended if the property is to maintain its biodiversity values. Potential extensions would have to be further analysed with a focus on integrity.
- Shey Phoksundo National Park and Upper Dolpo in Nepal are a rare case of strong local interest in developing a World Heritage nomination. As the remote area is large, intact and overlapping with recognised conservation priorities, further analysis is recommended.
- Sanjiangyuan on the Tibetan Plateau and the Yaluzangbudaxiagu Nature Reserve (both China) have been singled out as sites of possible World Heritage calibre in a specific study.
- The Central Karakoram in Pakistan, perhaps including adjacent areas in India and China.
- From a desert conservation perspective, Band-E-Amir (Afghanistan) and the Hunza Valley in the Karakoram of Pakistan deserve further consideration.

# Acknowledgements

This independent assessment is the main product of a project that would not have been possible without the generous and much appreciated support of the National Geographic Society. Sincere thanks are due to Jonathan Baillie for believing in the project and to Dr Sandra Elvin for taking the time to contribute to the workshop in Kathmandu in person.

The author would like to sincerely thank ICIMOD for the very pleasant and collegial cooperation throughout the project and, in particular, the generous hosting of the international workshop in Kathmandu. The workshop brought together distinguished representatives from the regional member countries. All of them – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan – are also States Parties to the World Heritage Convention. In addition, representatives from neighbouring Tajikistan, likewise a State Party to the Convention, actively contributed to the workshop. The author owes a debt of gratitude to all workshop participants and involved ICIMOD staff for their readiness to contribute their time, knowledge and dedication to this joint effort. Special thanks are due to Dr David James Molden, Dr Eklabya Sharma, Dr Nakul Chettri, Dr Sunita Chaudhary and Mr Kabir Uddin at ICIMOD for their commitment. All maps were kindly provided by ICIMOD.

Sincere thanks are also due to Cyril Kormos, Vice-Chair for World Heritage of the World Commission on Protected Areas, as well as Founder and Executive Director of Wild Heritage, a project of the Earth Island Institute. This joint effort would not have come to life without him and the support of Wild Heritage.

Finally, sincere thanks are due to Mizuki Murai (IUCN), Alessandro Balsamo (UNESCO World Heritage Centre), Kai Weise (ICOMOS Nepal) and Kai Windhorst (GIZ) for helpful guidance and comments on draft versions of this assessment. Dr Nakul Chettri, Dr Sunita Chaudhary, Bastian Bertzky (European Commission Joint Research Centre), Cyril Kormos and Remco van Merm (IUCN) conducted most valuable full reviews of an advanced draft version of this assessment.



# Abbreviations and acronyms

<b>BNCU</b>	Bangladesh National Commission for UNESCO
<b>BRI</b>	Belt and Road Initiative
<b>CBD</b>	United Nations Convention on Biological Diversity
<b>CCHTLCDI</b>	Cherrapunjee-Chittagong Hill Tracts Landscape Conservation and Development Initiative (ICIMOD initiative)
<b>CEPF</b>	Critical Ecosystem Partnership Fund
<b>CI</b>	Conservation International
<b>CKNP</b>	Central Karakoram National Park
<b>CPD</b>	Centres of Plant Diversity
<b>CPEC</b>	China Pakistan Economic Corridor
<b>EBA</b>	Endemic Bird Area
<b>EII</b>	Earth Island Institute
<b>FEOW</b>	Freshwater Ecoregions of the World
<b>GBPNIHESD</b>	GB Pant National Institute of Himalayan Environment and Sustainable Development
<b>GHCA</b>	Garo Hills Conservation Area
<b>GHNP</b>	Great Himalayan National Park
<b>ha</b>	hectare
<b>HBWA</b>	High-Biodiversity Wilderness Areas
<b>HI-LIFE</b>	Landscape Initiative for Far-Eastern Himalayas (ICIMOD initiative)
<b>HKH</b>	Hindu Kush Himalaya
<b>HKPL</b>	Hindu Kush Karakoram Pamir Landscape (ICIMOD initiative)
<b>HVWS</b>	Hukaung Valley Wildlife Sanctuary
<b>IAS</b>	Invasive alien species
<b>IBA</b>	Important Bird and Biodiversity Area (previously Important Bird Area)
<b>ICIMOD</b>	International Centre for Integrated Mountain Development
<b>ICOMOS</b>	International Council on Monuments and Sites
<b>ICT</b>	Information and communications technology
<b>IFL</b>	Intact Forest Landscape
<b>ILWS</b>	Indawgyi Lake Wildlife Sanctuary
<b>IPBES</b>	Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services
<b>IUCN</b>	International Union for Conservation of Nature
<b>JDNP</b>	Jigme Dorji National Park
<b>KBA</b>	Key Biodiversity Area
<b>KCA</b>	Kanchenjunga Conservation Area
<b>KLCA</b>	Keibul Lamjao Conservation Area
<b>KLCDI</b>	Kangchenjunga Landscape Conservation and Development Initiative (ICIMOD initiative)
<b>KSL</b>	Kailash Sacred Landscape (ICIMOD initiative)
<b>KSLCDI</b>	Kailash Sacred Landscape Conservation and Development Initiative (ICIMOD initiative)
<b>LULCC</b>	Land use and land cover change
<b>m a.s.l.</b>	metres above sea level
<b>NDNP</b>	Nanda Devi National Park
<b>NGS</b>	National Geographic Society
<b>NMFC</b>	Northern Mountain Forest Complex
<b>NTCA</b>	National Tiger Conservation Authority (India)

<b>NTFP</b>	Non-timber forest products
<b>NTNP</b>	Natma Taung National Park
<b>OG</b>	Operational Guidelines (for the Implementation of the World Heritage Convention)
<b>OUV</b>	Outstanding Universal Value
<b>RMNP</b>	Royal Manas National Park (Bhutan)
<b>RSPN</b>	Royal Society for Protection of Nature (Bhutan)
<b>SP</b>	State Party (to the World Heritage Convention)
<b>SWS</b>	Sakteng Wildlife Sanctuary
<b>TAR</b>	Tibet Autonomous Region
<b>TEEB</b>	The Economics of Ecosystems and Biodiversity
<b>TEOW</b>	Terrestrial Ecoregions of the World
<b>TL</b>	Tentative List (referring to the World Heritage Convention); also used by ICIMOD as an abbreviation of Transboundary Landscape
<b>TPR</b>	Three Parallel Rivers of Yunnan Protected Areas
<b>TraMCA</b>	Transboundary Manas Conservation Area
<b>UNESCO</b>	United Nations Educational, Scientific and Cultural Organization
<b>VoFNP</b>	Valley of Flowers National Park
<b>WCPA</b>	World Commission on Protected Areas
<b>WII</b>	Wildlife Institute of India
<b>WWF</b>	World Wide Fund for Nature

# Background, objectives and structure

# 1



The Khangchendzonga Massif seen across forested ridges within the mixed World Heritage property in Sikkim, India.  
© IUCN / Tilman Jaeger.



**Map 1: The Hindu Kush Himalaya as defined by ICIMOD and neighbouring mountain ranges with main rivers and glaciers.**  
Source: ICIMOD. The overall disclaimer stated at the beginning of this assessment applies.

Abode of Gods  
Abodes of Deities  
Connection between Heaven and Earth  
High Asia  
Abode of Snow  
Third Pole  
Roof of the World  
Land of Snow  
Axis mundi  
Earth's Highest Mountains  
Water Tower of Asia

Region (TAR), Qinghai and down to Kachin State in Myanmar, the Hengduan Mountains separate the lowlands of Northern Myanmar from the Sichuan Basin.

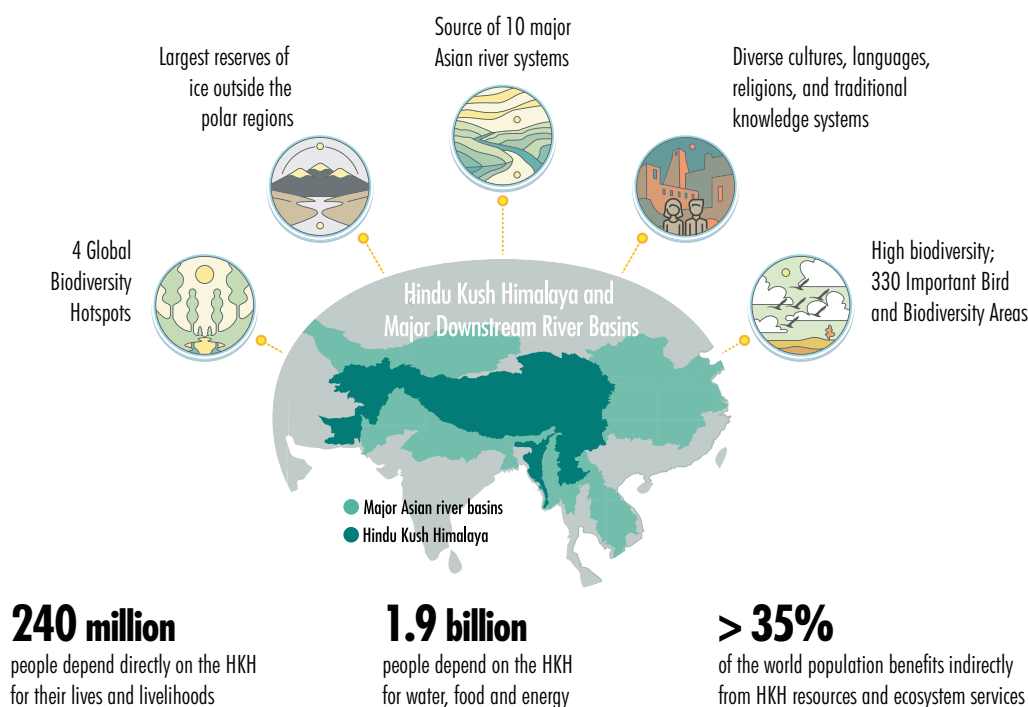
Encompassing several of the world's most impressive and remote mountain ranges, the arc even extends north along the Taklamakan Desert. Due to the absence of clear geographic borders, there is no universally accepted definition of the Himalaya and how it relates to the wider mountain system, sometimes referred to as High Asia. This is visualised in the map above, which also shows the region's major rivers and massive glaciated areas.

Derived from Sanskrit, Himalaya literally means 'Abode of Snow'. Many terms have been coined to express the exceptionality of the Himalaya – and the neighbouring mountain ranges of South and Central Asia. They leave no doubt about the superlative nature of a unique geographic, cultural, spiritual and religious space and reference point. Nonetheless, the terms stop short of fully reflecting the stunning natural and cultural diversity and complexity of one of the planet's most diverse, fascinating and vulnerable regions.

The Himalaya proper is commonly defined as the rugged arc between the Tibetan Plateau and the Ganges Plain stretching from the Indus River in the northwest all the way to the great bend of the Brahmaputra River (known upriver as the Yarlung Tsangpo) in the east. A closer look, however, reveals that there are no sharp geographic divisions between the Himalaya proper and a much larger, contiguous ridge of folds and upthrusts in the region. As a giant alpine system, the overarching ridge is situated to the south of the Tibetan Plateau from the Hindu Kush in Afghanistan to the Hengduan Range in the Chinese Provinces of Yunnan and Sichuan. Reaching into the Tibetan Autonomous

This assessment adopts the concept and definition of the Hindu Kush Himalaya (HKH) region used by the International Centre for Integrated Mountain Development (ICIMOD), which describes itself as the regional intergovernmental learning and knowledge-sharing centre serving its eight regional member countries. According to this definition, the region comprises all or parts of 12 distinguishable mountain ranges, extending over some 3,500 kilometres over all or part of eight countries from Afghanistan to Myanmar. The Himalaya proper at its heart spans a still stunning 2,600 to 2,700 kilometres from northwest to southeast. Bhutan and Nepal are the only countries located within the Himalaya proper and the HKH region in their entirety.

As detailed in subsequent chapters, the natural and cultural values of the region are as overwhelming as its scenic beauty. The same holds true for the region's enormous ecosystem services provided to residents, downstream users and indeed the world. Sometimes referred to as the 'Third Pole', the Himalaya and adjacent ranges boast the world's largest freshwater resources outside the two polar regions. This 'Water Tower of Asia' underpins the livelihoods, food security and energy provision of



**Figure 1: The global importance of the Hindu Kush Himalaya as a superlative mountain ecosystem. Source: Wester et al. (2019).**

a substantial part of the world's human population. HKH is the origin of as many as ten of Asia's major river systems. Most are shared by several countries and thus bear different names in addition to many local names. They include the Brahmaputra (Yarlung Tsangpo), Ganges, Indus, Mekong (Lancang), Salween (Nu), Tarim (Dayan), Yangtze (Jinsha) and the Huanghe (Yellow River).

Since time immemorial, the HKH region has been home to an extraordinary diversity of peoples, cultures, languages, religions and belief systems, intricately depending on, and interacting with, the mountain landscape and its resources. Sophisticated local and indigenous knowledge systems, practices and deep spirituality are among the results of this longstanding co-evolution.

From an ecological perspective, the vast HKH region contains not only the highest vertical gradients anywhere on land, but also an unparalleled diversity of ecosystems and habitats along the enormous east-west and north-south gradients. Teeming with life in all its forms, the HKH region is a globally unique meeting point of four biodiversity hotspots, which to this day is still to reveal many of its biological secrets. Between 1998 and 2008, for example, at least 353 species new to science were discovered in the Eastern Himalayas alone, including an impressive 50 vertebrates (Thompson, 2009, cited in Xu et al., 2019).

It is clear that such an exceptional region is of significant relevance to an intergovernmental agreement with the objective to identify and conserve the world's most precious cultural and natural heritage. This is precisely what the World Heritage Convention (hereafter the Convention) aims at, referring to such places as properties of 'Outstanding Universal Value' (OUV). While quite a few World Heritage properties have been inscribed in the HKH region over the decades and others have been identified as

promising candidate sites, no comprehensive and up-to-date situation analysis is currently available. Such analysis can take advantage of the wealth of readily available information generated over the last decades, often under the leadership of ICIMOD.

Almost five decades into the life of the Convention, it is time to take stock of its past use and future potential as an instrument to add a layer of visibility, protection and accountability to the most valuable heritage of the region. A partnership-based project was formed to address this gap, bringing together the unique mandate and unmatched technical expertise of ICIMOD with the World Heritage role and expertise of the International Union for Conservation of Nature (IUCN), of which ICIMOD is a Member. Among other tasks and mandates, IUCN is one of the formal Advisory Bodies to the World Heritage Committee, the intergovernmental body responsible for the implementation of the Convention.

This assessment is the main product of a project with the objective to convene partners from the eight regional ICIMOD member countries, and neighbouring countries as applicable, to find common ground in terms of regional nature conservation priorities and how the Convention might best be used as leverage for their conservation, including beyond national borders. Specifically, both the overall project and the international workshop at its heart centred around the following objectives:

- To contribute to a better understanding of the Convention and its potential in the region;
- To identify possible broad World Heritage gaps and opportunities in the region;
- Explore concrete potential places of Outstanding Universal Value (OUV) in the region with special consideration of existing transboundary initiatives; and
- Prepare a foundation for possible next steps in the region.



This assessment is strictly technical in nature; it aims at shedding light on the regional potential of the Convention from a nature conservation perspective based on a literature review and expert consultation. An international workshop co-hosted by ICIMOD, Wild Heritage, IUCN and The National Geographic Society and held at ICIMOD's headquarters in Kathmandu served as an essential step to receive and discuss inputs from experienced colleagues from the region, as documented in separate, publicly available proceedings (ICIMOD, 2019a). Incorporating further feedback from the participants of this workshop and additional selected reviewers, this assessment is to serve both as a stock-taking exercise and an inspiration for possible next steps.

The overall process underpinning the elaboration of this independent assessment is summarised as follows:



**Figure 2:** Process underpinning the assessment. Source: Author

Following this introductory chapter, the assessment provides an overview of the regional setting prior to a chapter dedicated to the region's particularities from a conservation perspective. Subsequently, both the inscribed World Heritage properties and the natural candidate sites on the so-called Tentative Lists of the eight involved ICIMOD member countries are briefly presented and discussed. Reference is made to neighbouring countries when deemed relevant, such as in the case of transboundary areas of major conservation interest outside HKH as defined by

ICIMOD. The heart of the assessment, chapter 5, systematically screens the literature for hints at regions and sites of possible World Heritage 'calibre', while also fully taking into account the rich discussions at the international workshop in Kathmandu. A synthesis and recommendations are offered as food for thought and a foundation for possible next steps. Furthermore, a bibliography, including useful online resources is provided. Finally, the annexes provide the reader with selected additional information, including maps.

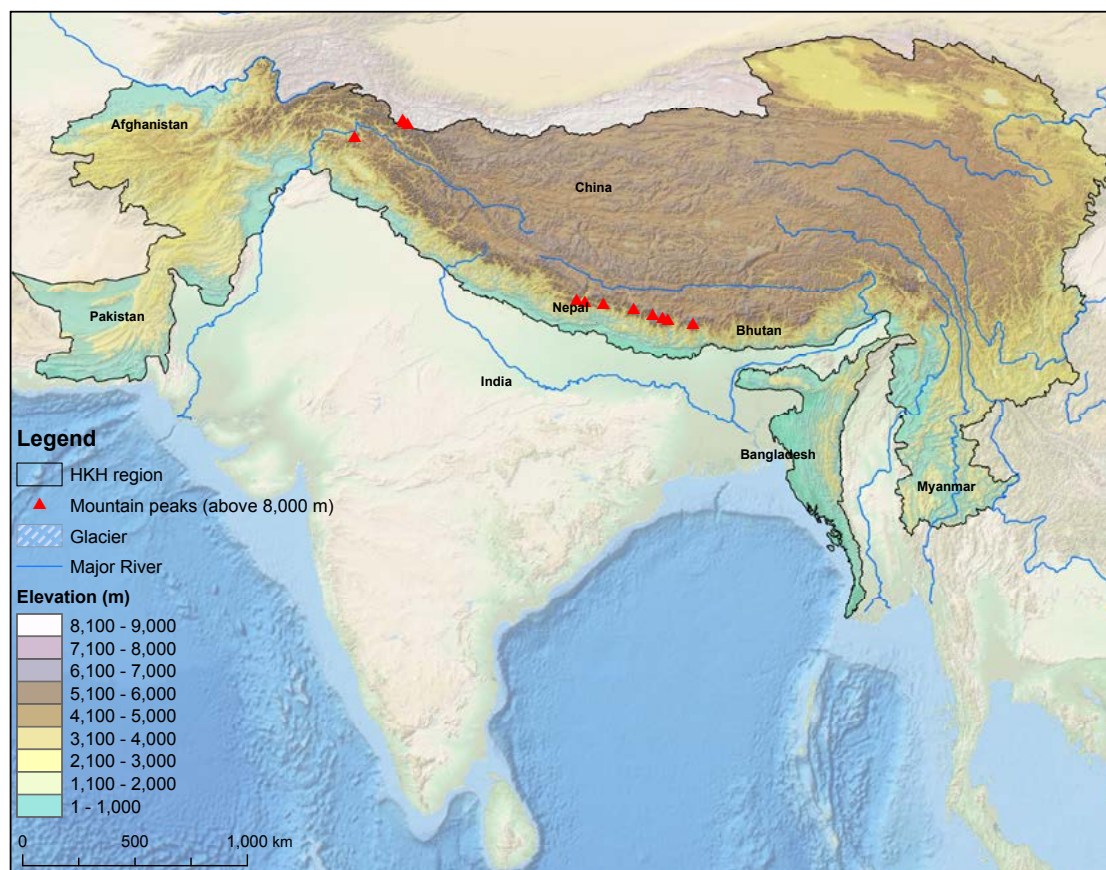


# The regional setting

## 2







**Map 2: The Hindu Kush Himalaya region as defined by ICIMOD. Source: ICIMOD.**

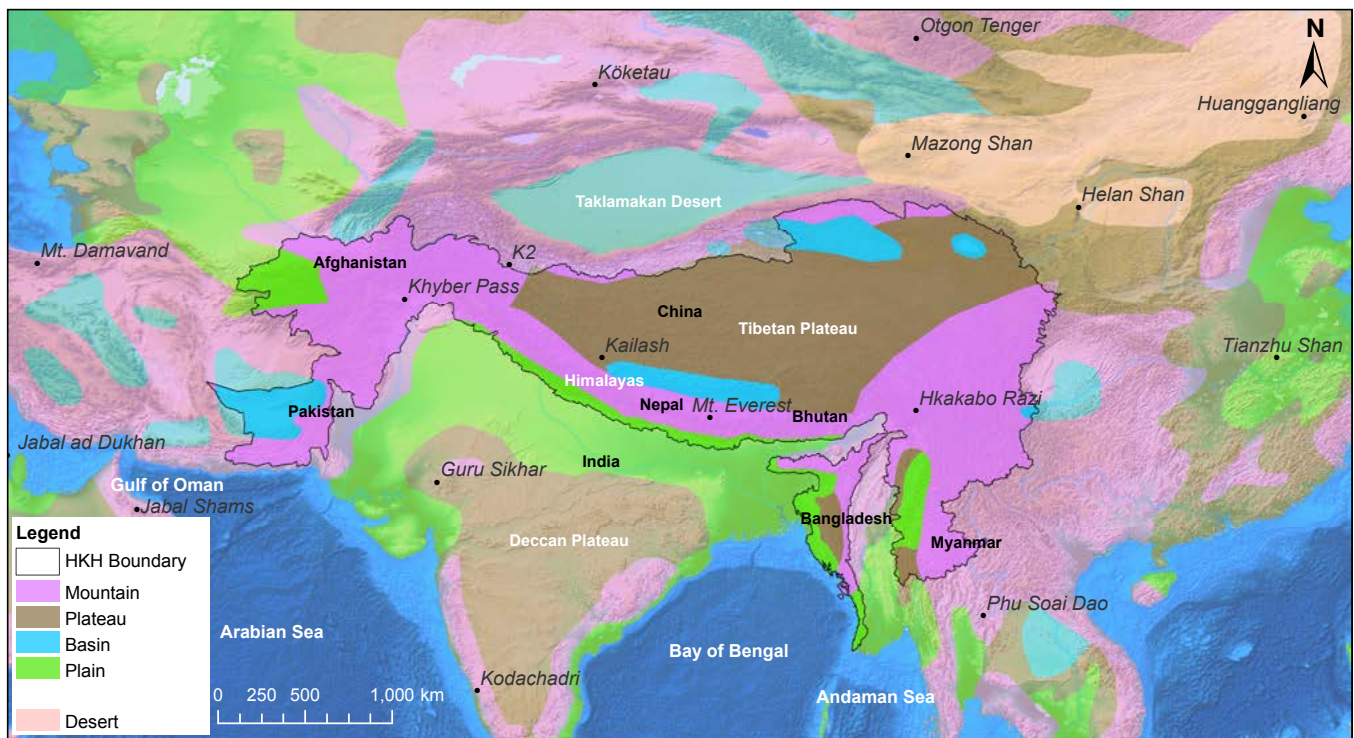
## 2.1 The heart of High Asia

This simplified overview draws heavily upon the *Illustrated Atlas of the Himalaya* elaborated by ICIMOD and the University of Eastern Kentucky, USA (Zurick et al., 2006), as well as the recently published *Hindu Kush Himalaya Assessment* (Wester et al., 2019). The latter is a most useful open access resource, arguably the most comprehensive assessment of the HKH region ever undertaken and compiled. Additional literature, as cited, was considered. This chapter does not pretend to compete with the many excellent overviews readily available, including those mentioned above and others produced by ICIMOD. Rather, it aims at synthesising key information in concise and inevitably somewhat dense fashion to expose interested readers in and beyond the region to the stunning characteristics of the HKH region and to set the stage for the subsequent analysis and recommendations. Readers interested in a more thorough understanding of the regional context and particularities may find the bibliography and links useful (chapter 7).

As noted, this assessment adopts the ICIMOD definition of the vast Hindu Kush Himalaya (HKH) as its focus. This region by far exceeds the Himalaya proper, as visualised in Map 2 below. It cannot be overemphasised that the High South Asian mountain rim land, of which HKH is an integral part both ecologically and culturally, is even larger. Sometimes called High Asia, the South-Asia Highlands or the Pan-South Asian highland system, the wider rim land includes all of the Pamir Mountains beyond the parts covered by the ICIMOD definition of HKH, thereby reaching into Tajikistan and Kyrgyzstan. The Pamirs, in turn, bridge the

Himalaya proper not only to the Hindu Kush and Karakoram, but also to the Tien Shan and Kunlun Shan ranges. There are important links and similarities even with the Altai Mountains further north shared by China, the Russian Federation's Altai Republic, Mongolia and Kazakhstan. IUCN has published a separate World Heritage study with a focus on Central Asia, which includes coverage of some of these neighbouring mountain ranges (Lethier, 2019, see also Magin, 2005).

The Himalaya is among the geologically youngest mountain ranges on Earth. The starting point of its geological history is commonly dated back to some 60 million years ago only, when the Indian Plate eventually began colliding with the Eurasian Plate according to the theory of continental drift. Compressed seafloor of the ancient Tethys Sea was dramatically uplifted over time, as can be seen today by the omnipresent twisted strata of rocks – and marine fossils next to the world's highest peaks and glaciers. Much of the rising of the Himalaya is even more recent – and ongoing. As a so-called high energy environment, HKH is extremely susceptible to erosion and landslides, often aggravated by inappropriate land and resource use. The permanent subduction dynamics explain both the vertical uplift and the high seismic activity expressed in recurrent, often violent earthquakes. Most unfortunately, some of the seismically most dynamic zones coincide with the most densely populated and intensively used lower elevations south of the iconic snow-covered peaks of the Himalaya proper. The massive earthquake hitting Nepal in April 2015, also severely affecting several neighbouring countries, serves as a tragic and recent reminder of the region's exceptional vulnerability to natural disasters.



**Map 3: The four main zones or belts of the wider region.** Simplified visualisation of commonly distinguished zones or belts in the HKH and wider region according to latitude and altitude and other factors. Source: ICIMOD. The overall disclaimer stated at the beginning of this assessment applies. Note that there are no deserts in the HKH as defined by ICIMOD.

Even a mere scratching on the surface of the geological history of the HKH offers first clues to the region's extreme biogeography and unparalleled ecosystem diversity. At the broadest level, the extreme north–south geological profile corresponds to major ecological units. Simultaneously, HKH is strongly influenced by numerous additional and interacting factors, such as Pleistocene glaciations, the location of much of the region in the middle of a vast continental mass and the heavy influence of the South Asian monsoon, in particular towards the east. The climate is semi-oceanic to oceanic in the eastern part of HKH and increasingly continental as one proceeds westward. Generally speaking, the climate of the HKH encompasses the full range from arctic to tropical conditions.

Underpinned by the geology, four main zones are commonly distinguished in the HKH and contiguous ranges sharing the geological origin. Starting in the north, these zones can be described as parallel belts roughly following a northwest to southeast direction:

- the Tibetan zone on the margin of the Tibetan Plateau in the rain shadow of the peaks, also called the Trans-Himalaya;
- the Great or High Himalaya, put simply the world-famous towering peaks embedded in an almost contiguous sea of ice, snow and rocks;
- the Lower or Lesser Himalaya, also known as the middle mountains; and
- the adjacent Outer Himalaya or Outer Himalayan Foreland comprising several lower ridges, in some areas also referred to as the Siwalik Foothills or the 'Gateway to the Himalaya'.

## 2.2 A glance at biogeographic approaches to the region

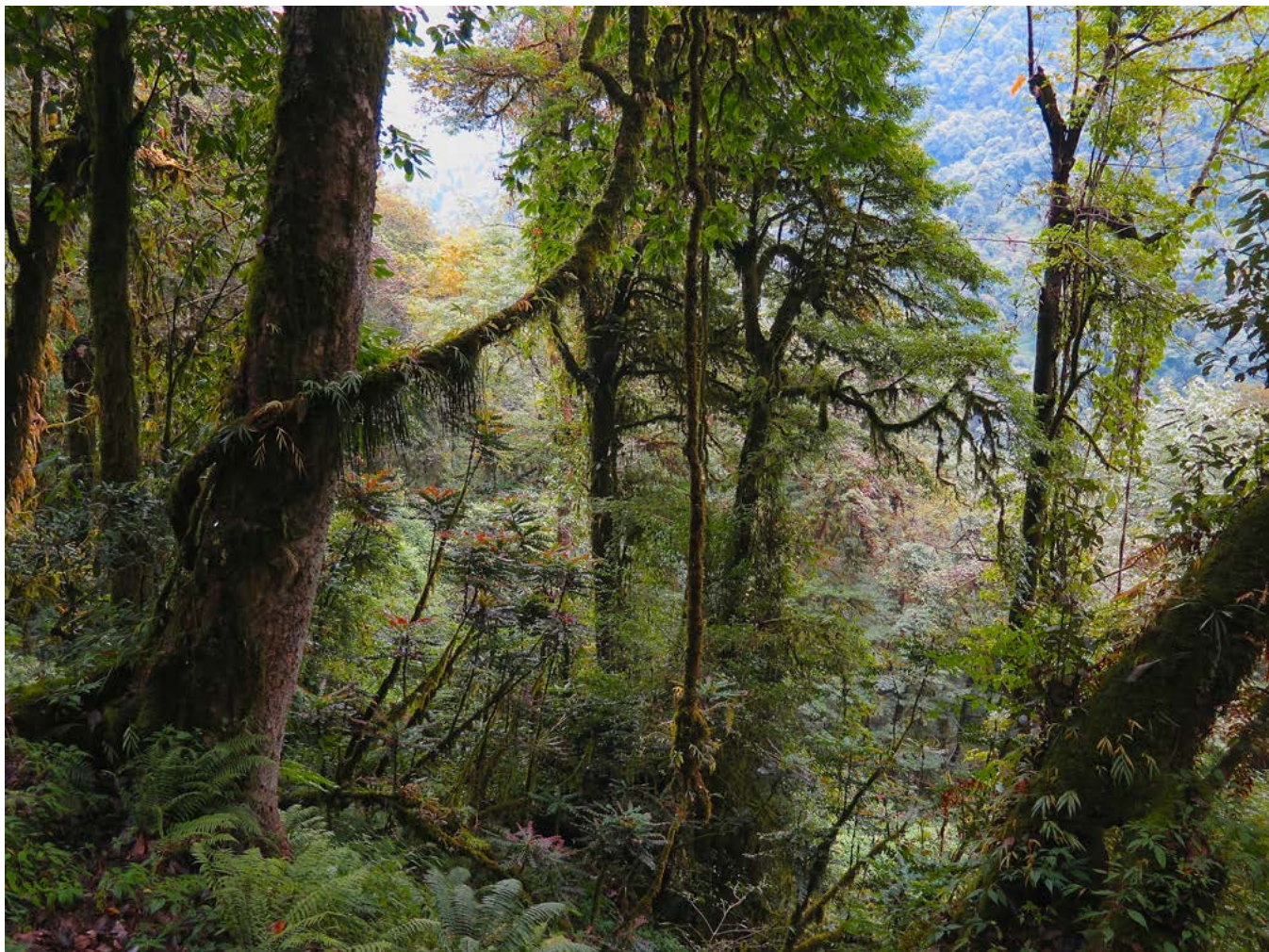
When attempting to classify the overwhelming biogeographic and ecological diversity, the altitudinal gradients are commonly evoked. Gradients from east to west are similarly extreme in the HKH. Temperatures covering the full range from tropical to arctic conditions and unmatched changes in precipitation can partially be attributed to these gradients. However, overlapping factors, such as wind, glaciation, slope and exposure to wind and sun add complexity and diversity.

It is clear that a profound appreciation of what may well be the biogeographically and ecologically most complex region of the world is beyond the scope of this assessment. Nonetheless, an introduction was considered helpful as a foundation for the subsequent analysis in chapters 4 and 5. It deserves to be mentioned that IUCN uses both the Udvardy classification and the WWF terrestrial, freshwater and marine ecoregions of the world as principal references in its global comparative analyses, an essential part of the independent evaluation of natural and mixed World Heritage nominations (see UNESCO / Intergovernmental Committee for the Protection of the World Cultural and Natural Heritage, 2019).

At the broadest level, one straightforward and common approach to classify the heart of the region is to distinguish the eastern and western parts of the Himalaya, often using the Kali Gandaki Gorge (Thak Khola) in Nepal's renowned Annapurna Conservation Area as a natural division and widely accepted biogeographic barrier.

Broadly speaking, the Western Himalaya shares more similarities with the nearby Central Asian ranges, whereas the Eastern





**Photo 1:** Lush temperate forest in Khangchendzonga National Park, India. © IUCN / Tilman Jaeger.

Himalaya is ecologically more comparable to the adjacent ranges in southwest China and northern Myanmar. The Critical Ecosystem Partnership Fund (CEPF) adopts the entire Himalaya as a – highly threatened – global conservation priority, while putting its focus on the Eastern Himalayas. CEPF (2005) defines the Eastern Himalayas as encompassing all of Bhutan and the Indian State of Sikkim, as well as other parts of India and parts of Nepal. While there are no universally accepted definitions, references to the Western and Eastern Himalayas, respectively, are common in the literature. Zurick et al. (2006) speak of western, central and eastern ‘sectors’. According to their approach, the western sector extends from the Indus River to the western border of Nepal, whereas the eastern sector encompasses Bhutan and the sparsely settled lands extending to the east all the way to the great bend of the Brahmaputra River, known as the Yarlung Tsangpo upriver. The central sector, according to this source, includes all of Nepal and the Indian state of Sikkim.

In his classic *Biogeographical Provinces of the World*, Udvardy (1975) placed the region at the intersection of what he referred to as the Palaearctic and the Indomalayan terrestrial biogeographic realms. At the more detailed level, this author proposed the Himalayan Highlands biogeographical province within the Palaearctic realm, roughly coinciding with the area often referred to as the Himalaya proper. Within the same realm, the Himalayan

Highlands, from west to east, are adjacent to the following biogeographic provinces:

- Hindu Kush Highlands;
- Pamir-Tian-Shan Highlands;
- Tibetan; and the
- Szechwan (Sichuan) Highlands.

To the south, the Himalayan Highlands transition into the Indian subcontinent and thereby into the Indomalayan Realm. For the most part, the adjacent biogeographic provinces are the Indus-Ganges Monsoon Forest and, to the east, the Bengalian Rainforest and Burma Monsoon Forest, respectively. In other words, the mountains transition into vast tropical and subtropical forests towards the south.

Udvardy (1975) further distinguished 14 ‘Principal Biome Types’ worldwide. The highlands of the Himalaya, Hindu Kush, Pamir-Tian-Shan and Szechwan (Sichuan) of the Palaearctic realm are all classified as ‘Mixed mountain and highland systems with complex zonation’, whereas the Tibetan biogeographic province is situated within the ‘Cold-winter (continental) desert and semi-deserts’. As for the Indomalayan Realm, the Indus-Ganges and Burma Monsoon Forests belong to ‘Tropical dry and deciduous forests (incl. monsoon forests) or woodlands’, while the Bengalian Rainforest is part of the ‘Tropical humid forests’, according to

Udvardy. The vast belt of extremely distinct forest types from the often extremely high treeline into lush lowland jungles is a good example of the tremendous ecological diversity enabled by the extreme geography, topography and climatic variety of the HKH.

More recent and detailed classification systems include the terrestrial ecoregions of the world (TEOW, see Olson and Dinerstein, 2002 and Olson et al., 2001 and 2000). While slightly differing in terminology, Olson and colleagues propose realms and biomes, which are directly comparable to Udvardy's classification. One major contribution of the TEOW approach is the significant refining at the level of ecoregions, resulting in a roughly fourfold increase of biogeographic units against the comparable level of detail (biogeographical provinces) by Udvardy (1975). Combining a biogeographic approach with conservation priority-setting, 238 ecoregions were determined to constitute global conservation priorities. Comprised of 142 terrestrial, 53 freshwater and 43 marine priority ecoregions, Olson and Dinerstein (2002) coined the term Global 200 for this subset of ecoregions, used by WWF and others for planning and communication purposes. Chettri et al. (2008) used the WWF ecoregions, including the Global 200, as a reference framework to assess the status of protected areas in HKH, as discussed in section 5.3.1. They found that the HKH region encompasses as many as 60 ecoregions. Almost half of them (29) belong to the Global 200, as listed in Annex 8.4.

In summary, it is fair to say that the HKH region is biogeographically and ecologically without parallel due to its combination of magnitude, diversity and extremes. Literally all features and attributes of high mountain ecosystems are amplified in the HKH. The landscape, ecosystem and habitat mosaic are reflected in, and intricately linked with, a similarly stunning ethnic and cultural diversity. Adapted to the extreme conditions imposed by an unforgiving terrain, many of the living cultures predate modern nation-states, but are increasingly influenced by the latter. This is briefly summarised in the subsequent chapter.



# A brief introduction to the region from a nature conservation perspective

## 3



Sacred site within Khangchendzonga National Park. One of the many sacred places within the mixed World Heritage property, often coinciding with exposed places enabling views of the Khangchendzonga Massif. © IUCN / Tilman Jaeger.





**Photo 2: Agricultural terraces in the Lower Himalayas © ICIMOD.**

Building on the previous chapter, this synthesis has the objective to provide readers with an introduction to the region from a conservation perspective heavily drawing on the above-mentioned key sources of information. Zurick et al. (2006) remind us that the Himalaya is too vast and diverse to permit a single explanation for the relationship with its many and highly dynamic human cultures. They note that the most severe environmental degradation and extreme poverty coexist with intact and productive landscapes. The same can be said of the wider HKH region. The subsequent introduction is therefore inevitably simplified and should be read accordingly.

### 3.1 A glance at the ongoing human history

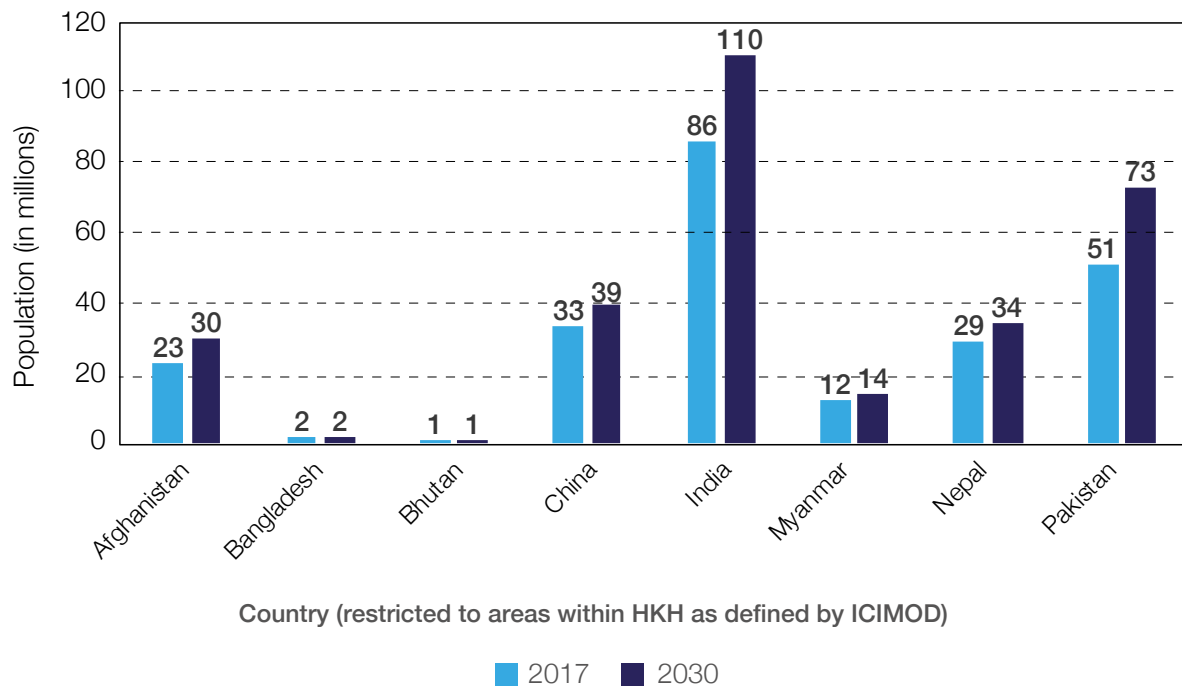
The Himalaya has been settled and used for thousands of years, its human history intricately interacting with all neighbouring regions. Influences have stemmed from regions as diverse and distinct as Central Asia, the Tibetan Plateau, the Indian subcontinent and Southeast Asia. Encounters with existing local indigenous societies have resulted in clashes and acculturation. The longstanding and continued meeting of Hindu, Buddhist, Islamic and Animist elements has shaped both a mosaic and a melting pot of culture, religion, mythology and spirituality.

Long before modern day globalisation, major trade routes facilitated access, exchange and trade along the major valleys. The historic Silk Road north of the High Himalaya has north-south connections with the Grand Trunk Road in the Ganges Plain across several high and rugged passes of the Western Himalaya. The ancient routes were used for the exchange of salt and grain across the mountains along with trade in numerous other goods. Another ancient form of exchange has been the trade of animal products by mobile livestock herders for the

grain and vegetables of sedentary farmers, omnipresent across the HKH region since time immemorial. More recently, roughly between the middle of the 19<sup>th</sup> and the 20<sup>th</sup> centuries, colonialism heavily impacted on the region's societies and resources, with many ongoing consequences from the creation of contemporary nation-states.

While even extremely high-altitude grasslands have been used for transhumance, nomadic and semi-nomadic herding, hunting and gathering for at least centuries and to this day, the Lower Himalayas and the adjacent foothills of the Outer Himalayas have long been the most intensively inhabited, used and managed belts of the HKH and adjacent ranges. The landscapes of the Lower Himalayas and neighbouring areas have visibly been shaped by the longstanding interaction between humans and a rich but harsh natural environment. The slopes of entire valleys have been converted to level terraces wherever it was possible – and at times even where it seems impossible.

With few exceptions, population growth was historically slow in the region, both due to high mortality rates and as a result of cultural practices. Notable population growth is documented to have increased only since the late 19<sup>th</sup> century, initially distributed very unevenly. Since the 1950s, population growth has been much more pronounced and more evenly distributed across large parts of the lower elevations of the HKH. Zurick et al. (2006) suggest a doubling of the population over the second half of the 20<sup>th</sup> century. A simple overview of predicted population growth within HKH from 2017 until 2030 is provided by country in Figure 3 below. With the exception of Bangladesh and Bhutan, both of which are assumed to maintain their current population sizes, considerable population growth is anticipated throughout the region.



**Figure 3: Current (2017) and predicted (2030) human population in the Hindu Kush Himalaya as defined by ICIMOD. Source: Adapted from Wester et al. (2019).**

High immigration in the Lower Himalayas for several decades has been adding additional pressure on forests, pastures, farmland, water and other vulnerable resources. Nepal's Terai region, Sikkim, the Indus Mountains and the lower elevations of the Garhwal are commonly cited examples of particularly rapid population growth, in some cases exceeding 4% per year, a result of increasing birth rates, decreased mortality rates and migration. Migration patterns, however, also encompass out-migration, as important and growing numbers of people leave the Himalaya in search of opportunities, typically elsewhere in Asia or the Gulf states.

In addition to migration, the rise of urban centres is another overarching, strong and relatively recent trend. For the first time ever, a significant part of the population of the mountain region, dominated by mobile, rural and agrarian societies since time immemorial, is now living in rapidly expanding cities. The growth of a population largely dependent on local resources, urbanisation, changing lifestyles and consumption patterns, as well as the increasing demand for natural resources of the HKH from the local to the global level, translate into unprecedented pressure on the mountain ecosystems. Moreover, these factors jointly translate into – and are reinforced by – the rapid expansion of transportation, energy and communications infrastructure, opening access to previously remote mountain areas. One prominent initiative is the Belt and Road Initiative (BRI) promoted by the Chinese government, which also targets vast parts of the HKH. As Wester et al. (2019) put it, demands for natural resources are increasing in tandem with local and regional socio-economic development, to which could be added global factors. Summarising a sobering outlook, these authors conclude that “demand pressures exacerbated by population growth” jointly constitute the “main (ultimate) driving forces leading to over-exploitation in HKH”.

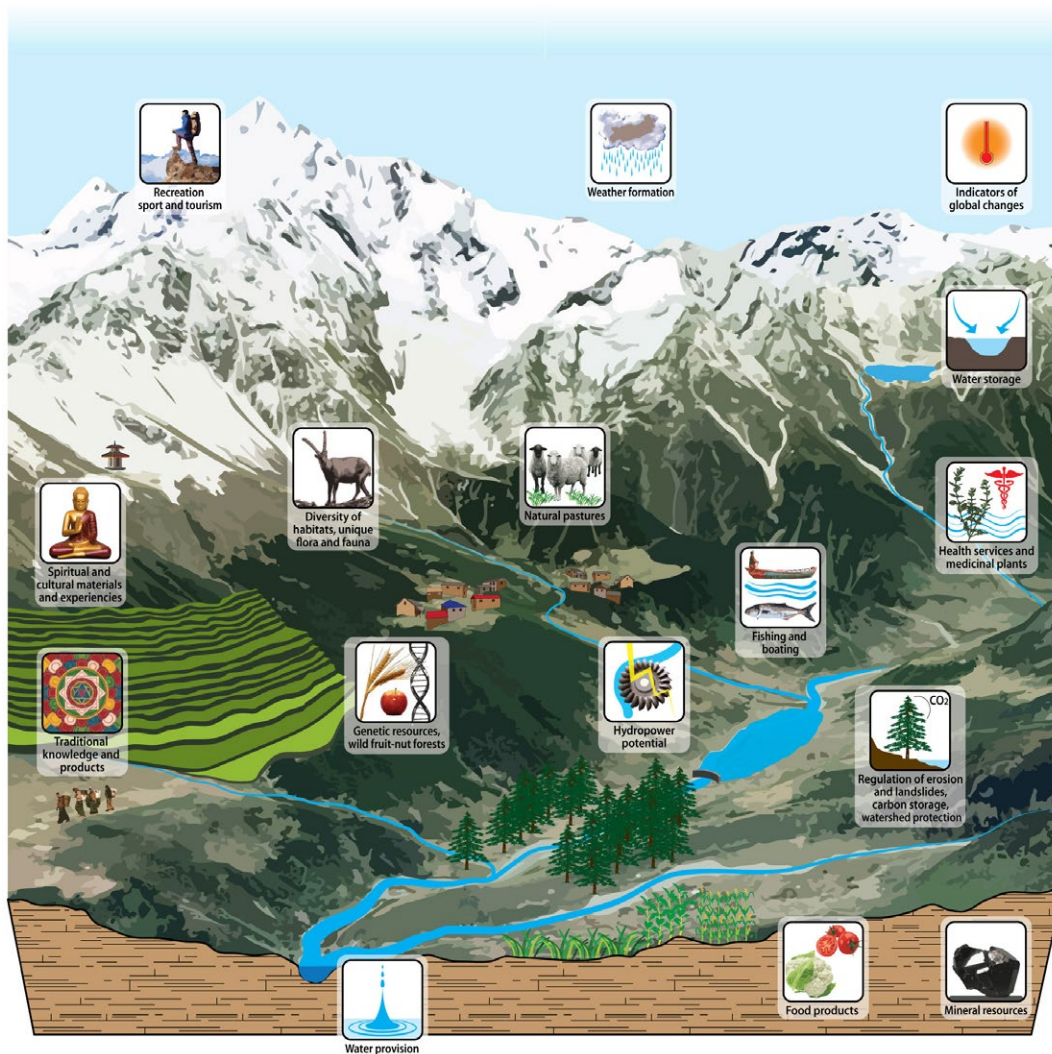
Globalisation is leaving an increasingly large and deep mark in a “landscape in which the textures of human societies are interwoven in a traditional world of sacred places and powerful natural forces” (Zurick et al., 2006). In the words of these authors, “the demands of modern times and global trends have become dominant in many localities, instilling new forms of social organization and forging new appraisals of life that may create conflict as well as provide opportunity among the mountain communities. In this ever-changing world, Himalayan societies struggle between tradition and modernity.”

### 3.2 Ecosystem services and conservation values

The HKH boasts an enormous range of conservation values, goods and services. While most are per se well-known from other major mountain ranges, they are amplified in the HKH in many ways. The most recent ICIMOD figures suggest that some 240 million people directly depend on HKH for their lives and livelihoods. To these can and should be added some 1.65 billion people living downstream in the river basins originating in HKH, bringing the total of people depending on HKH for water, food and energy to a stunning more than 1.9 billion. ICIMOD further notes as much as one third of humankind benefits from food produced in HKH's river basins.

The increasingly nuanced debate about ecosystem services is beyond the scope of this assessment. Interested readers may wish to consider excellent overviews offered by the Millennium Ecosystem Assessment, the Economics of Ecosystems and Biodiversity initiative (TEEB) and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES), also to appreciate the direct linkages between biodiversity, ecosystem services and human well-being. Most mountain



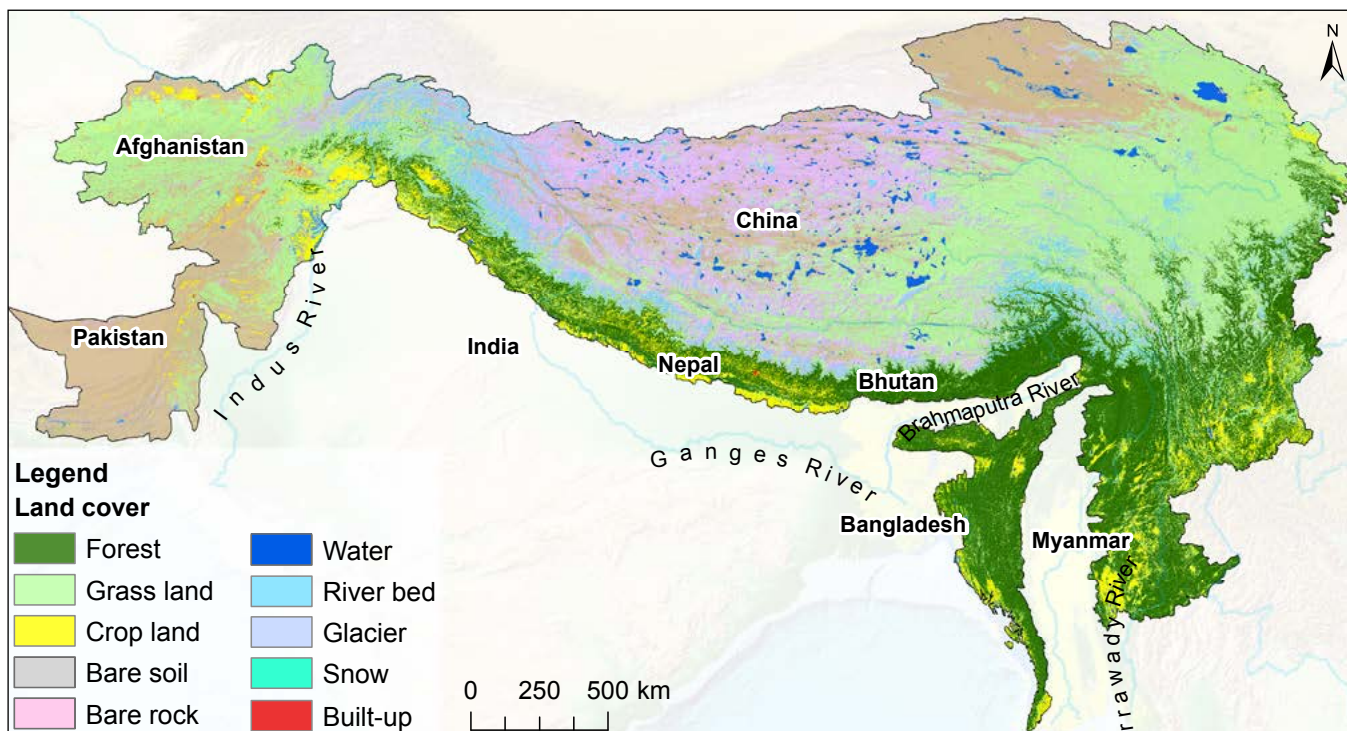


**Figure 4: Mountain ecosystem goods and services.** While the displayed provision of goods and services can be applied to all inhabited mountain ranges, the relevance in the HKH is literally amplified. Source: Nieves Lopez Izquierdo, UN Environment – GRID Arendal. <https://www.grida.no/resources/12619>.

regions across the world share a wide range of major ecosystem services as visualised in Figure 4.

Common typologies distinguish between provisioning, regulating, cultural and supporting ecosystem services. Other overlapping classification approaches differentiate social, cultural, ecological and economic services. All such services are prominent in mountain regions, including the HKH. For the HKH region specifically, this brief spotlight draws on Xu et al. (2019, see also Chaudhary et al., 2019). The authors build a strong case for the critical role of natural capital underpinning life-support systems and human well-being across HKH, including as follows:

- Pronounced, inextricable links between biodiversity, livelihoods and culture, manifested in customs, traditions and sacred values. Culture has been influencing the accessible biophysical landscapes for at least centuries. The nexus between culture and ecosystems includes spiritual and religious values, inspiration, sense of place, knowledge and indeed entire worldviews. Even though they are particularly pronounced in the ethnically, culturally and religiously diverse HKH, such values tend to be neglected in, or excluded from, decision-making.
- Sacred valleys, trees, groves, rivers, lakes and peaks are omnipresent across HKH with important implications for natural resource management, including nature conservation.
- High degree of direct local dependency on ecosystems, such as rangelands, wetlands and forests, for subsistence livelihoods and local economies. Direct services and benefits of ecosystems and wild biodiversity include food, fuelwood, pasture, fodder, medicinal plants and non-timber forest products (NTFPs) with obvious implications for food security, health and overall human well-being.
- Massive economic services most prominently include water provision for consumption, agriculture and energy of a stunning proportion of the world's human population when counting downstream beneficiaries, unmatched by any other mountain system. The freshwater resources encompass the largest area of permanent ice cover of the world outside the polar region when adding the Tien Shan ('Third Pole'). They constitute a globally important asset with corresponding geopolitical implications. As in other mountain ranges, there is a classic upstream–downstream dilemma, the distance between sourcing and consumption



Map 4: Land cover map of the Hindu Kush Himalaya. Source: ICIMOD.

of mountain ecosystem services being particularly long and politically complex in the HKH. It is clear that observable and anticipated further climate change add significant further complexity.

- Tourism and recreation have become an integral element of the economies in many locations; both are mostly based on ecosystem services.
- Significant carbon storage in forests, grasslands and wetlands.

Ecosystem services are closely linked to ecosystem integrity, biodiversity and nature conservation. The latter contributes to maintaining the former, thereby generating tangible benefits to human well-being. While such relationships are well-established and increasingly acknowledged, they are still not, or insufficiently, reflected in economic and political decision-making.

More specific nature conservation values are summarised hereafter. HKH boasts the world's highest mountain at 8,848 m a.s.l., Mount Everest (also known as Sagarmatha, Chomolungma or Zhumulangma among other names). All of the world's 14 peaks above 8,000 m a.s.l. are located within HKH, including the second highest peak in the world in the Karakoram (K2, also known as Qogir Feng, Mount Godwin Austen, Dapsang or Chogori among other names). Every single one of these peaks, as well as the very large numbers of high peaks below 8,000 m a.s.l., provides a spectacular scenic backdrop to an overwhelming mountain landscape. As defined by ICIMOD, the region descends all the way to the shores of Myanmar, encompassing the longest possible altitudinal gradient on the planet. Other extremes epitomising the stunning natural environment comprise the world's deepest canyons, the Kali Gandaki Gorge and the Yarlung Tsangpo Grand Canyon and the places with the highest known annual precipitation on Earth – in a range also including deserts hardly receiving any rainfall. There

is every reason to consider the HKH a promising region when searching for superlative natural features; after all it is the world's superlative mountain range by a whole range of standards.

The nature conservation values of HKH are undoubtedly globally significant. One seemingly trivial reason for the conservation significance of the HKH is its sheer massiveness. As defined by ICIMOD, the region covers almost 3.5 million square kilometres, an area larger than India. This vast high altitude area simply cannot be compared to any other place on the planet, because no such areas exist anywhere else. The world's highest mountains outside of HKH are almost 2,000 metres lower than Mount Everest. Vast areas at the highest elevations of HKH are thus in a league of their own worldwide.

At the broadest level, HKH can be divided into the following dominant terrestrial ecosystems and land uses (Chettri et al., 2008):

- High altitude grassland (39%);
- Forest (20%);
- Shrubland (15%);
- Agricultural land (5%);
- Barren land, rocky outcrops, built-up areas, snow cover, water bodies (21%).

Map 4 visualises the ecosystems and land uses at a slightly finer scale.

It becomes obvious that the towering peaks and snow-covered highlands, which probably dominate the perception of the HKH and in particular the Himalaya across the world, in fact take up a relatively small percentage of the land. Almost three-quarters of the land is comprised of grassland, forest and shrubland, rich in biodiversity at all levels, often with very high levels



of endemism. Forests, shrublands and grasslands have a longstanding history of human use, challenging the perception of the HKH as an inaccessible and inhospitable land of rocks, ice and snow.

Broadly speaking, the extreme variation in altitude, topography and soils, as well as enormous climatic gradients, have resulted in an endlessly complex and diverse mosaic of ecosystems and habitats at the congruence of two of the world's eight terrestrial realms. HKH is a globally unique meeting point of four biodiversity hotspots, the Himalaya, the Mountains of Central Asia, the Mountains of Southwest China and the Indo-Burma Biodiversity Hotspot. Biodiversity hotspots, as defined by the proponents of this widely used global biodiversity priority-setting scheme, are determined by the combination of exceptional biological richness and exceptionally high levels of threats. As an example of the biological wealth, the Himalaya Hotspot alone, the only one within HKH in its entirety, boasts some 10,000 recorded vascular plant species, roughly a third of which are endemic to the Himalaya. Interested readers are invited to consult the publicly available ecosystem profiles compiled by the Critical Ecosystem Partnership Fund (CEPF) for each of the above hotspots as most valuable sources of information (see 7.4).

As is observable elsewhere across the planet, the high biological diversity of the HKH conspicuously coincides with exceptionally high ethnic, cultural, religious and language diversity; the latter comprising hundreds of living languages (Gorenflo et al., 2012). There are deep linkages between nature and culture, expressed in sophisticated local and indigenous knowledge, governance and management systems, religious taboos, sacred landscapes and landscape elements, high levels of agricultural biodiversity and local conservation traditions. There can be no doubt that the cultural and spiritual dimension of conservation is of particular importance in a mountain range where indigenous peoples and local communities in many locations continue to be the most experienced 'managers' of the land.

### 3.3 Drivers of change

The following overview heavily draws on the *Hindu Kush Himalaya Assessment* (Wester et al., 2019), in particular chapters dedicated to "drivers of change of mountain sustainability" (Wang et al., 2019), "unravelling climate change" (Krishnan et al., 2019), adaptation to climate change (Mishra et al., 2019) and "sustaining biodiversity and ecosystem services" (Xu et al., 2019). All of these chapters are highly recommended to readers interested in a nuanced and up-to-date appreciation of drivers of change in the HKH. Generally speaking, the authors consistently argue that (i) global drivers of change disproportionately affect the region due to its high natural vulnerability as a geologically young and dynamic high mountain environment and its inadequate governance structures and that (ii) the multiple factors are not only intricately linked with each other, but also increasingly influenced by regional and global developments.

Wang et al. (2019) broadly distinguish between environmental, socio-cultural and economic drivers, while emphasising

the intricate interrelationships between and among these dimensions. Starting with environmental drivers, their main results can be synthesised as follows:

- The general trends of land use and land cover change (LULCC) include the loss and degradation of grasslands and wetlands, as well as deforestation at lower altitudes, such as through transformation to farmland, urban and infrastructure development. Early restoration efforts are suggested as a reason for cautious optimism due to slowing or even reversing the mentioned trends in some areas.
- Wild biodiversity is an integral and critically important element of local livelihood systems. Examples of the extraordinary importance of wild biodiversity in the HKH for food security and income generation include omnipresent livestock grazing, harvesting of non-timber forest products (NTFP) and hunting. There is a fine line between local use of wild biodiversity and exploitation beyond natural productivity and ecosystem resilience. Livelihood systems developed as subsistence systems in relative isolation can easily become unsustainable as a consequence of external demand and market access. The Yarsa Gumbu caterpillar fungus (*Ophiocordyceps sinensis*), perhaps the world's most expensive wild biodiversity product today, epitomises this dilemma in the HKH by generating income while also resulting in major direct and indirect environmental impacts.
- Over-exploitation is visible in many places as a result of poorly planned tourism. Despite desired contributions to income generation and employment, waste management and locally intensified resource extraction are just two of multiple negative impacts.
- Extractive industries, hydropower development and associated access and transmission infrastructure can and do have particularly strong direct and indirect impacts in fragile mountain and river systems and associated ecosystems.
- Despite its remoteness and extreme topography, the HKH is not immune to the full range of organic and inorganic pollution of soil, air and water from mining, agriculture, vehicle traffic, industry and households. Pollution even affects large, remote and seemingly 'pristine' areas without noteworthy local pollution sources by means of long-distance atmospheric transport from industrial regions. Despite information gaps, there is clear evidence that ecosystems and human health are affected, as well as climate, the cryosphere, monsoon patterns, water availability, agriculture and incomes (see Saikawa et al., 2019).
- The status and impact of invasive alien species (IAS) in HKH is not systematically known. Available studies indicate widespread presence of IAS, including many of the world's most harmful and damaging invasive plants. As elsewhere, it can reasonably be assumed that the presence and impacts of IAS are increasing with growing transportation and other infrastructure development, trade, migration and tourism. Concern about IAS is not restricted to conservation concerns, as the economic and even cultural costs are becoming ever more evident across the world.

### 3. A brief introduction to the region from a nature conservation perspective

**Table 1:** Influence of key drivers of change in the region on sustainability. The three pillars of sustainability are defined as environmental, sociocultural and economic by the authors. Arrows indicate trends (↗: increase; →: stable). Note that not a single driver was assessed as showing a decreasing trend. Source: Wang et al. (2019), slightly adapted and simplified by author.

Drivers within three categories		Three pillars of sustainability		
		Environmental protection	Sociocultural equity	Economic viability
Environmental	Land use and land cover change	↗	→	↗
	Over-exploitation of natural resources	↗	↗	↗
	Pollution	↗	→	↗
	Invasive alien species	↗	→	↗
	Mountain hazards	→	↗	↗
	Climate change and variability	↗	↗	↗
Sociocultural	Demographic changes	↗	↗	↗
	Sociocultural changes	→	↗	↗
	Governance systems and institutions	↗	↗	↗
	Technological implementation	↗	↗	↗
Economic	Economic growth and differentiation	↗	↗	↗
	Infrastructure development	↗	↗	↗
	Urban expansion	↗	↗	↗

Level of influence: high medium low

- Mountain hazards occur in all mountain systems and include landslides and erosion. As can be said for many features of the HKH, such hazards are amplified in the topographically and climatically extreme region with its young and ongoing geological history. Massive earthquakes are common in the tectonically highly active zone.
- The authors likewise list climate change as a major overarching concern, see also Krishnan et al. (2019) and Mishra et al. (2019).

Sociocultural drivers of change are synthesised here drawing on Wang et al. (2019):

- Based on United Nations' data, the total population of the HKH was estimated to be around 225 million in 2015. The authors suggest further growth and urbanisation resulting in "substantially more people in vulnerable urban areas in the next 20 years".
- While the HKH has ancient relationships with much larger political and cultural spheres, the pace of the social and cultural changes in the "materiality, values and aspirations, and social relations", according to the authors, "has accelerated exponentially since the 20<sup>th</sup> century".
- The emergence of nation-states comes with efforts to integrate the previously peripheral HKH into national

mainstreams. There are contradictory trends between globalisation making deep inroads into HKH on the one hand and restrictions to historically established movements and relations due to tightened and even militarised borders elsewhere.

- The authors paint a sobering picture of governance systems and institutions in what they refer to as "one of the least integrated regions in the world". Challenges singled out besides a lack of regional integration include a lack of integration of sector policies, instability and conflict resulting in 'conflict economies' known to negatively affect natural resource management, a lack of integration between formal and informal governance institutions, breakdown of local institutions, and lacking or inadequate responses to a continuously growing population in the plains.
- Fully acknowledging the importance and depth of local and indigenous knowledge systems, modern science and technology are among the key driving forces of change. The authors suggest both benefits and risks associated with external knowledge and technological innovations, in particular in the realms of information and communications technology (ICT), geospatial technology and agricultural productivity.



Economic drivers, as structured by Wang et al. (2019), include:

- Economic growth, reflected in heavy increase in trade, tourism, resource extraction, labour migration and national growth figures. The national growth data disguise the extreme variability among and within countries in a region facing widespread poverty. They also disguise the external costs of economic growth.
- Over the last decades, transportation and energy infrastructure development has been a powerful driver of change; in particular hydropower and associated infrastructure, as well as a rapidly growing road network. Access is a double-edged sword coming with both opportunities and risks of major environmental, social and cultural impacts. Major current large-scale initiatives with infrastructure implications include, but are not limited to: the 'Belt and Road Initiative' (BRI), promoted by China as a modern-day Silk Road; an economic corridor in Pakistan's mountainous provinces with heavy investment in transportation and hydropower, likewise promoted by China; and the 'Look East' policy promoted by India.

Table 3 summarises the main drivers of change and corresponding trends. Note that not a single trend is decreasing according to Wang et al. (2019).

Krishnan et al. (2019) remind us of the importance of the HKH in global weather patterns as a heat source in summer and a heat sink in winter and thereby as a significant influence within the Asian summer monsoon system. Acknowledging important information deficits and the absence of consensus among models for the region, the authors summarise their attempt at "unraveling climate change in the HKH" as follows:

- Future global warming is expected to be higher in the HKH than the global average, especially in the northeast Himalaya and the Karakorum. The expected effects include biodiversity loss, increased glacial melting and less predictable water availability with major implications for both the environment and human well-being.
- Over the past five to six decades, extreme warm events have become more common, whereas extreme cold events show the opposite trend.
- Contrary to widespread belief and the overall pattern suggested above, snowfall probability in the Karakorum and western Himalaya appears to be increasing, which is assumed to result in an increase of glacier mass in those areas.

In summary, while keeping the exceptional heterogeneity of HKH in mind, population growth and other demographic change, economic growth, increasing demands from local to global levels, climate change and weak governance systems are singled out as overarching drivers of change in a recent and comprehensive overall assessment of the HKH (Wester et al., 2019) within an overall climate change scenario adding many uncertainties. The HKH has long been and continues to be one of the world's 'resource frontiers'. Especially the peripheral and remote parts of the HKH become increasingly attractive for resource extraction as more accessible locations become

exhausted. The impacts from demands stemming from outside the region are ever more important, one dramatic example being hydropower development, often to meet demands outside of HKH (for a useful overview see for example Dharmadhikary, 2008). The authors further argue that almost all of the above drivers are increasing in intensity, trends they suggest will continue in the near future.



# Re-visiting natural World Heritage in the Hindu Kush Himalaya

## 4



Indian Peafowl (*Pavo cristatus*) in Chitwan National Park, Nepal. © IUCN / Remco van Merm.



This chapter extracts and discusses basic information on all existing World Heritage properties in the HKH region inscribed under at least one natural World Heritage criterion (section 4.1) while touching upon selected other properties in the immediate vicinity when deemed relevant from a technical perspective. It then reviews all ‘candidate sites’ proposed under at least one natural World Heritage criterion on the so-called Tentative Lists (TL) of the corresponding State Party to the Convention (section 4.2). Tajikistan, a State Party to the World Heritage Convention, has been added to the analysis even though it is not a regional member state of ICIMOD. This was considered useful due to the somewhat artificial separation of the Pamir Mountains in the ICIMOD definition of HKH in line with the organisation’s country membership. It deserves to be noted in this context that Tajikistan is part of ICIMOD’s Hindu Kush Karakoram Pamir Landscape Initiative (HKPL), along with Afghanistan, China and Pakistan. All raw data was extracted from the World Heritage Centre’s website at the time of writing (see 7.4).

Box 1 provides readers unfamiliar with the conceptual underpinning of the World Heritage Convention with a basic introduction.

### 4.1 World Heritage properties in the region inscribed under natural World Heritage criteria

Bhutan and Nepal are the only two countries situated entirely within the HKH region as defined by ICIMOD. In these cases, the data publicly made available by the World Heritage Centre could be used in their current form. In all other cases, the World Heritage inscriptions by country had to be filtered according to their location within or outside of HKH, kindly facilitated by ICIMOD. Some properties and candidate sites were considered relevant despite being located outside the HKH region, and are indicated by the use of italics and grey shading.

#### The three pillars of Outstanding Universal Value from a natural Heritage perspective

World Heritage properties are expected to feature extraordinary conservation values from a global perspective. This is captured in the central term and concept of ‘Outstanding Universal Value’ (OUV). However, “to be deemed of Outstanding Universal Value (OUV), a property must also meet the conditions of integrity and/or authenticity and must have an adequate protection and management system to ensure its safeguarding” in the wording of the *Operational Guidelines for the Implementation of the World Heritage Convention* (Operational Guidelines, or OGs), which guide the implementation of the Convention. In other words, there is an unambiguous requirement for any (nominated) property not only to meet one or several World Heritage criteria, but also to comply with defined conditions of integrity and requirements for protection and management. In the case of cultural heritage, there is an additional requirement of ‘authenticity’. All three foundations of OUV, often referred to as the ‘three pillars of OUV’, have to be fully considered in any World Heritage context.

#### Meeting natural World Heritage criteria

The OGs distinguish four natural criteria out of the ten World Heritage criteria (see Annex 8.3 for full text). Put simply, criterion (vii) encompasses landscape beauty and superlative natural phenomena, while criterion (viii) is often referred to as the ‘geological criterion’. Criteria (ix) and (x) are informally referred to as the ‘biodiversity criteria’. At least one natural criterion must be met in order to comply with World Heritage requirements. However, compliance with one criterion – or several criteria – per se does not amount to compliance with all requirements established to justify World Heritage status.

#### Meeting the conditions of integrity

The OGs define ‘integrity’ under the World Heritage Convention as a “measure of the wholeness and intactness of the natural and/or cultural heritage and its attributes”. In the wording of the OGs “understanding integrity” therefore “requires assessing the extent to which the property:

- a) includes all elements necessary to express its Outstanding Universal Value;
- b) is of adequate size to ensure the complete representation of the features and processes which convey the property’s significance;
- c) suffers from adverse effects of development and/or neglect.”

Furthermore, the OGs also define conditions of integrity individually for each natural World Heritage criterion.

#### Adequate protection and management system

The establishment of protected areas is not equivalent to effective nature conservation. To meet World Heritage requirements, it is insufficient for an area to boast formal (or in some cases informal) protected area or conservation area status. The OGs also detail the requirements in this regard; put simply, there must be demonstrable willingness and capacity to effectively manage and conserve a given area.

At its best, the World Heritage Convention adds a layer of protection, visibility and accountability to the world’s most extraordinary places.

**Box 1: Outstanding Universal Value from a natural Heritage perspective. Source: Author based on the Operational Guidelines of the World Heritage Convention.**

**Table 2: Existing World Heritage properties in the region inscribed under natural World Heritage criteria. Table in alphabetical order by State Party. Properties marked in rows in shaded in grey are located outside the HKH as defined by ICIMOD. The areas of buffer zones are provided when applicable and available. Source: UNESCO, World Heritage Centre.**

Property name	Criteria	Year	Area (ha) / Observations
<b>Afghanistan (0 properties within HKH)</b>			
<i>The State Party currently has two properties inscribed under cultural World Heritage criteria, but none under natural World Heritage criteria.</i>			
<b>Bangladesh (0)</b>			
<i>The Sundarbans are currently the State Party's only property inscribed under natural World Heritage criteria in addition to two cultural properties. Major rivers directly link the Sundarbans to the HKH, which is why the property serves as a textbook example for ecological and hydrological linkages from sea to summit – at a most impressive scale. As the Sundarbans are not within HKH as defined by ICIMOD, the property is not considered further in this assessment.</i>			
The Sundarbans	(ix)(x)	1997	139,500 ha / The property is contiguous with the Sundarbans National Park in India, inscribed as a (formally separate) World Heritage property in 1987 under identical World Heritage criteria (see below).
<b>Bhutan (0)</b>			
<i>The State Party currently has no property on the World Heritage List</i>			
<b>China (5)</b>			
Qinghai Hoh Xil	(vii)(x)	2017	3,735,632 ha (buffer zone of 2,290,904 ha). The recently inscribed property is by far the largest of China's 14 natural and four mixed properties and is among the largest terrestrial World Heritage properties worldwide. Located in the northeast of the Qinghai-Tibetan Plateau, the property also boasts an impressively vast buffer zone.
Sichuan Giant Panda Sanctuaries - Wolong, Mt Siguniang and Jiajin Mountains	(x)	2006	924,500 ha (buffer zone of 527,100 ha). The serial property is exclusively located within Sichuan Province. While famous for the namesake giant panda, the property boasts many other and major biodiversity values.
Three Parallel Rivers of Yunnan Protected Areas (TPR)	(vii)(viii)(ix)(x)	2003	Some 1.7 m ha (no conclusive buffer zone data readily available). The large serial property is a rare property inscribed under all four natural World Heritage criteria and encompasses 15 protected areas, grouped into eight clusters. All are located in the northwest of Yunnan Province. Several components of the serial property share long borders with Sichuan Province, the Tibetan Autonomous Region (TAR) and, to the west, Myanmar.
Huanglong Scenic and Historic Interest Area	(vii)	1992	60,000 ha. One of the few natural properties on the World Heritage List inscribed exclusively under criterion (vii), likewise located exclusively within Sichuan Province.
Jiuzhaigou Valley Scenic and Historic Interest Area	(vii)	1992	72,000 ha. Another example of one of the few natural properties on the World Heritage List inscribed exclusively under criterion (vii). Like Huanglong, the property is located within Sichuan Province and was inscribed in the same year as Huanglong.
Xinjiang Tianshan	(vii)(ix)	2013	606,833 ha (buffer zone of 491,103 ha). This quite recent inscription of a large mountain World Heritage property is not located within HKH, but within the wider South Asian rim land. It is noted due to some similarities with HKH that deserve attention, for example in comparative analyses of sites in the HKH.
<b>India (3)</b>			
Khangchendzonga National Park	(iii)(vi)(vii)(x)	2016	178,400 ha (buffer zone of 114,712 ha). The only mixed property in the HKH borders a large protected area in Nepal and is an integral part of the Kangchenjunga Landscape Initiative – promoted by ICIMOD as one of a small number of operational priority transboundary landscape initiatives.
Great Himalayan National Park Conservation Area	(x)	2014	90,540 ha (buffer zone of 26,560 ha). The relatively recent inscription is a rare and promising example in the region of a conservation complex comprised of various protected areas.

Property name	Criteria	Year	Area (ha) / Observations
<b>India (3)</b>			
Nanda Devi and Valley of Flowers National Parks	(vii)(x)	2005 1988	71,783 ha (buffer zone of 514,286 ha). The property is noteworthy for a serial extension approved 17 years after the initial inscription and for linking two national parks via a massive buffer zone.
Manas Wildlife Sanctuary	(vii)(ix)(x)	1985	39,100 ha. An early inscription and another example of a border location. Note that the contiguous Royal Manas National Park (RMNP) was inscribed on the Tentative List of Bhutan in 2012 (see 4.2). Also note that the property is technically located just outside the boundaries of HKH as defined by ICIMOD. Due to its importance and direct ecological linkages to the HKH, the property is nevertheless fully considered in the discussion of this technical assessment.
Kaziranga National Park	(ix)(x)	1985	42,996 ha. Another early inscription of a relatively small, yet extraordinary national park. Note that the property is technically located just outside the boundaries of HKH as defined by ICIMOD. Due to its importance and direct ecological linkages to the HKH, the property is nevertheless fully considered in the discussion of this technical assessment.
Sundarbans National Park	(ix)(x)	1987	133,010 ha; mentioned due to the direct hydrological linkages with the Himalayas, while not within HKH; contiguous with the Sundarbans in Bangladesh (see above).

#### Myanmar (0)

*The State Party currently has two cultural World Heritage properties, but none under natural World Heritage criteria*

#### Nepal (2)

Chitwan National Park	(vii)(ix)(x)	1984	93,200 ha. The early inscription conserves an extremely valuable remnant of Nepal's highly fragmented subtropical lowlands known as the Terai.
Sagarmatha National Park	(vii)	1979	124,400 ha. The earliest inscription in the HKH region. As is the case in Khangchendzonga National Park, both the peak and the massif of the highest peak on Earth are bi-national.

#### Pakistan (0)

*The State Party currently has six cultural World Heritage properties, but none under natural World Heritage criteria*

#### (Tajikistan, not a member state of ICIMOD) (n/a)

Tajik National Park (Mountains of the Pamirs)	(vii)(viii)	2013	2,611,674 ha. A massive property sharing a long border with neighbouring Kyrgyzstan.
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The location of the existing World Heritage properties within HKH is shown in Map 5.

Observations on the existing World Heritage properties in the HKH region under at least one natural World Heritage criterion are summarised below to extract noteworthy patterns as food for thought:

#### More than half of the HKH member states are without natural World Heritage properties

In light of the undisputed global nature conservation significance of the HKH, it is remarkable that four out of the eight ICIMOD member states currently have no natural World Heritage properties inscribed under natural World Heritage criteria (Afghanistan, Bhutan, Myanmar, Pakistan), with Bhutan having no property on the World Heritage List at all. If one adds Bangladesh, which has one natural World Heritage property outside the HKH region, five out of the eight ICIMOD member states have no natural World Heritage property in the HKH region. This is a striking and somewhat surprising result. While there is no single explanation for this result, one can safely conclude

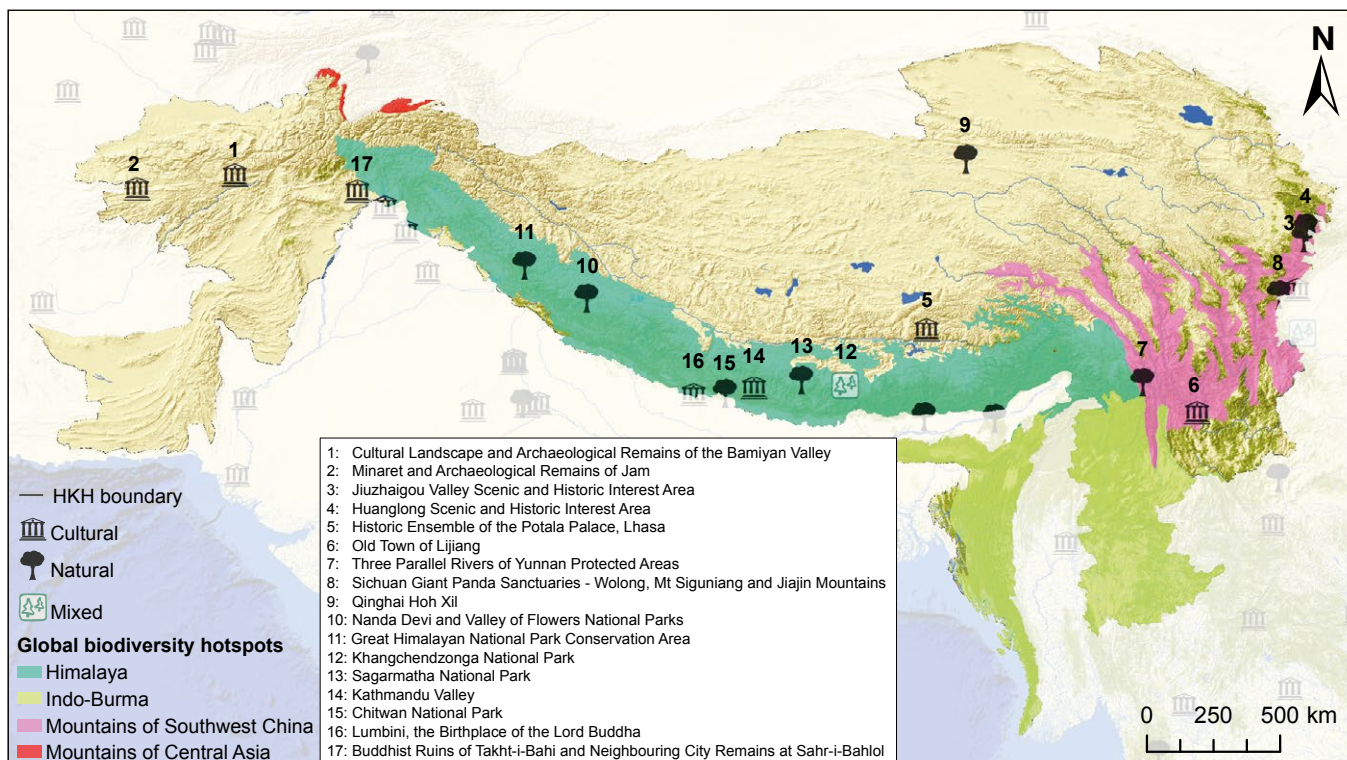
from a technical perspective that the potential of the Convention remains underutilised. Reasons for the small number of natural World Heritage nominations suggested by consulted colleagues include political sensitivities, especially in border settings and competing economic interests. Several colleagues argued that the Convention was typically perceived and administered as a tool for cultural rather than natural heritage in the region.

#### Uneven distribution

The ten properties inscribed under at least one natural criterion, including a single mixed property, are all located in the territories of three States Parties only. Out of the total of ten properties, eight have been inscribed in the two largest countries of the HKH, China and India. The two remaining properties are located in Nepal. Geographically, the absence of World Heritage properties in the entire west and southeast of HKH can be noted.

#### Almost entire absence of properties inscribed for their geological values

Three Parallel Rivers of Yunnan Protected Areas (TPR) is the only property in the entire HKH inscribed under World Heritage criterion



**Map 5: Natural, cultural and mixed World Heritage properties of the region.** Note the partial overlap with four global biodiversity hotspots indicated in colour. Number of properties by country as follows: Afghanistan (2), China (7), India (3), Nepal (4), Pakistan (1). Note that the hotspots are only shown as they overlap with HKH. The overall disclaimer stated at the beginning of this assessment applies.  
 Source: ©ICIMOD.

(viii), the ‘geological’ criterion. Given that TPR was inscribed under all four natural criteria, however, it is fair to say that this property has no specific focus on geological values. This noteworthy result suggests that it could be useful to conduct a more specific analysis of the regional potential under this criterion, which is beyond the scope of this assessment. Note that Dingwall et al. (2005) have elaborated a useful contextual framework to guide the interpretation of the many dimensions of criterion (viii). Wells (1996) proposed specific guidance on fossils (see Annexes 8.5 and 8.6).

### Few cultural properties and only one mixed World Heritage property in the entire HKH region

The relatively recent inscription of Khangchendzonga National Park in the Indian state of Sikkim marked the first, and to this day only, inscription of a so-called mixed World Heritage property (i.e. a site inscribed for both outstanding natural and cultural values). While there can be many explanations, one can reasonably argue that the potential to conceptually integrate the cultural and natural dimensions of the HKH under the umbrella of the Convention is in its very infancy. To put this gap into a global context, 39 mixed properties globally have been inscribed on the World Heritage List at the time of writing. While only a very small percentage of World Heritage properties have been inscribed for both their natural and cultural values across the world, the HKH region stands for a single inscription throughout the almost 50 years of the life of the Convention. While beyond the scope of this assessment, it deserves to be mentioned that there are only seven cultural properties in the HKH, that is an even smaller number than natural properties. Given that the number of cultural properties globally by far exceeds the number of natural properties, this ratio constitutes the surprising

opposite of the global picture, confirming the relatively limited use of the Convention within HKH.

### Inscription patterns over time

One should not over interpret the timing of inscriptions due to the multitude of factors motivating or discouraging States Parties to invest in World Heritage nominations. Moreover, as more than half of the States Parties have no World Heritage properties in the HKH region inscribed under natural criteria, it is not even possible to speak of a trend in these cases. While no clear general trend over time is suggested here, it is interesting to note that almost one third (3) of all inscriptions of properties under natural criteria (10) occurred within less than one decade between 1979 and 1988 (note that the first World Heritage properties were inscribed in 1978). One can thus argue that regional interest peaked in the first decade of World Heritage inscriptions. There have since been only two inscriptions each in the 1990s and the 2000s, respectively. The 2010s have seen an increase to three properties, which could generously be interpreted as an indication of renewed interest. At the country level, China’s first two inscriptions in the region occurred in 1992, two more in the 2000s and the most recent one in 2017. When including Manas and Kaziranga in the immediate vicinity of HKH, the data for India show two peaks, the first in the second half of the 1980s, when three of its five properties were inscribed. Ignoring the extension of Nanda Devi and Valley of Flowers National Parks in 2005 for this purpose, the recent inscriptions of two properties in 2014 and 2016, respectively, constitute the second peak. Nepal’s two natural World Heritage properties were both inscribed in the first years since the establishment of the World Heritage List in 1978.



### Several properties situated along or near international borders

It is noteworthy that several of the properties in the region are situated along international borders: Three Parallel Rivers of Yunnan Protected Areas (China), Khangchendzonga National Park (India) and the national parks of Chitwan and Sagarmatha (both Nepal). Sagarmatha and Khangchendzonga are noteworthy by each including one side of the bi-national peaks of the world's highest and third highest mountains, respectively. Despite its location outside HKH, Manas Wildlife Sanctuary deserves to be mentioned in a transboundary conservation context, as discussed below. Overall, transboundary considerations are thus a common, fundamentally important and politically sensitive feature of World Heritage in the region. It is astonishing that, almost 50 years into the life of the Convention, not a single one of the world's 19 transboundary natural or mixed World Heritage properties is located in the HKH despite the striking potential.

One could add the fact that many of the properties are configured along sub-national administrative divisions, such as the Three Parallel Rivers in Yunnan sharing a long border with Sichuan to the east. It can reasonably be argued that some of the challenges, costs and benefits of transboundary conservation apply to sub-national borders as well.

### Common location of properties on the margins of HKH

The above also illustrates that several properties inscribed under natural World Heritage criteria are situated along the southern

and eastern margins of the HKH. It seems conceivable that some areas coincide with the areas of highest human pressure, such as Chitwan National Park, which may have sparked a sense of urgency underpinning World Heritage momentum. The lower elevations of the southern and eastern margins of the HKH also coincide with areas known for particularly high biodiversity and degree of endemism, which may also explain the pattern.

### Hints at a conceptual evolution

Conservation thinking has been evolving over time. Scholars and practitioners increasingly share the conviction that national parks and comparable management categories and approaches are indispensable, but insufficient responses to ever more complex and profound conservation challenges. A wider range of management categories and governance set-ups, as well as a move from individual protected areas to coherent protected area systems or networks is widely considered to be necessary. Landscape approaches have the objective to go beyond the artificial separation of protected area 'islands' from their political, economic, social and cultural surroundings. It has also become clear that large areas with a high degree of naturalness are vanishing across the globe at an unprecedented pace. A group of conservationists associated with IUCN has been making the case that new approaches to conserve and manage large landscapes and seascapes with high conservation values are needed and that the Convention has largely untapped potential to serve as an umbrella for such approaches. Box 2 below briefly synthesises

#### Bringing together landscape conservation and the World Heritage Convention

A series of publications building upon each other has made the case for a need for a wilderness and large landscapes approach under the World Heritage Convention. The approach is in line with the widespread recognition that more or less small protected islands lost in ever more intensely used landscapes cannot amount to an adequate response to the biodiversity crisis under an overarching climate change scenario. It is important to be aware that the term 'wilderness' is controversial and interpreted in distinct ways. The proponents of the new approach understand the term as referring to landscapes and seascapes that are biologically and ecologically intact, have a low human population density and are mostly free of industrial infrastructure. As defined for the purpose, 'wilderness' is therefore by no means exclusive of people. It is explicitly acknowledged that many indigenous peoples and local communities do not separate human beings and their natural environment in their worldviews and belief systems. Intact landscapes and seascapes more often than not have ancient histories of local and indigenous stewardship and are critically important for the cultural survival of countless people.

Wilderness and large intact landscapes are quickly disappearing across the planet. This constitutes a very significant conservation challenge, as major ecological processes and entire species assemblages depend on large and connected intact ecosystems. The vanishing large intact landscapes also come with the loss of massive ecosystem services, such as globally important carbon stocks and water provision.

It has become a commonplace that individual protected areas cannot stem the tide of loss and degradation of functioning and diverse – and thereby resilient – natural ecosystems. Accordingly, conservation thinking has been shifting to systems or networks of larger protected areas, embedded in landscapes where conservation concerns are being fully considered. Following this very logic, it is clear that small and isolated national parks on the World Heritage List are a questionable response to the world's conservation challenge, increasingly at odds with the challenges at hand. Just like conservation thinking is evolving more broadly, the Convention needs to evolve to be more effective and remain relevant.

It is encouraging to note that there are signs of such conservation thinking entering the World Heritage arena, including in the HKH region. Namely, several recent inscriptions of very large natural properties come with the prospect of maintaining large-scale processes, viable populations of wide-ranging species and traditional livelihoods. Similarly, large serial approaches in essence can be described as sub-national protected area networks, offering the chance to maintain and restore connectivity under a World Heritage umbrella. Finally, the unprecedented recent inscription of a fascinating mixed property in Sikkim, Khangchendzonga National Park, could mark the beginning of a more in-depth consideration of the linkages between nature and culture in the region.

**Box 2: Bringing together landscape conservation and the World Heritage Convention. Source: Author drawing on Kormos et al. (2017).**



the rationale underpinning this emerging approach. Interested readers are invited to consider much more detailed discussion by Kormos et al. (2017 and 2015, see also Allan et al., 2018).

It is interesting to note that the two earliest inscriptions in the HKH region are relatively small national parks (Chitwan, Sagarmatha). When adding Kaziranga National Park and Manas, a small wildlife sanctuary at the time of inscription, a pattern of inscriptions of relatively small protected areas emerges. None of these protected areas had a formally defined buffer zone in line with contemporary World Heritage requirements and expectations at the time of inscription. These early inscriptions thereby reflect standard governmental and technical conservation thinking, law and practice at the time. It is remarkable and encouraging that an emergence of more complex approaches is observable over time, in line with the ideas synthesised in Box 2. This is summarised as follows:

- The inscription of three very large properties since 2003 (Qinghai Hoh Xil, Sichuan Giant Panda Sanctuaries – Wolong, Mt Siguniang and Jiayin Mountains and Three Parallel Rivers of Yunnan Protected Areas, all in China) are strong and regionally unprecedented commitments to the Convention and its objectives.
- Two of the above large-scale inscriptions are serial properties, namely, they are comprised of distinct protected areas linked under one coherent World Heritage approach (Wolong, Mt Siguniang and Jiayin Mountains; Three Parallel Rivers of Yunnan Protected Areas). Prior to 2005, there was not a single serial property in the region. The emergence of serial approaches is interpreted as a response to evolving conservation thinking beyond single protected areas, taking into account connectivity, change and larger-scale processes, etc.
- The property initially inscribed as the Nanda Devi National Park in 1988, was extended in 2005 to include Valley of Flowers National Park, since known as Nanda Devi and Valley of Flowers National Parks. It is interesting to note that the State Party did not consider an inscribed property to be a static achievement, but subsequently engaged in a consolidation of the World Heritage approach. Beyond the initial single national park, there are now two disjunct units connected via a vast buffer zone.

The Great Himalayan National Park Conservation Area (India) was inscribed in 2014 as an innovative mosaic or complex comprised of a national park and two contiguous wildlife sanctuaries. This configuration beyond a single protected area could serve as a model elsewhere in the HKH, which has numerous vast conservation complexes, or potential for such complexes. Several existing properties are contiguous with, or near, additional, often similarly valuable protected areas within the same landscape. In such cases, contiguous or serial extensions could consolidate World Heritage efforts.

As noted, the Indian property formally inscribed as Manas Wildlife Sanctuary in 1985, is located just outside HKH as defined by ICIMOD. As it is intricately linked to the Himalayas, including through the Manas River, it was considered useful to present and discuss the property nonetheless. The name and category

of wildlife sanctuary continues to exist in the name of the World Heritage property only. Legally, the roughly 39,000 ha of the former wildlife sanctuary became part of Manas National Park with an area of around 50,000 ha. The national park in turn is the core zone of the substantially larger Manas Tiger Reserve (238,000 ha). The case illustrates the evolution of the management of a global conservation priority. One lesson here is that it would seem helpful to re-visit the property with a view to reflect the spatial approach and management set-up in place with the logic of the World Heritage property, as has been repeatedly recommended. This may imply harmonisation of the property with the current boundaries of Manas National Park, and may also consider options to reflect the tiger reserve in a reconfigured property and/or buffer zone. The second major aspect deserving consideration is the location of the property on the border between two ICIMOD member countries. In fact, Royal Manas National Park in Bhutan is contiguous with the Indian property and a promising candidate on the Tentative List of Bhutan (see below). It is conceivable that the World Heritage Convention could play a useful role in the ongoing efforts by both States Parties to promote a large-scale *Transboundary Manas Conservation Area* (TraMCA).

### 4.2 The current Tentative Lists in the region

A Tentative List (TL) under the World Heritage Convention is formally defined as an “inventory of those properties situated on its territory which each State Party considers suitable for inscription on the World Heritage List” (see 7.4). Any World Heritage nomination requires prior listing on the TL of the corresponding State Party to the Convention. Besides this formal aspect, the elaboration and subsequent revisions of a Tentative List offer inspiring opportunities to discuss cultural and natural heritage conservation issues and priorities across jurisdictional and thematic boundaries. It is useful – and expected as part of the commitment to the Convention – that States Parties regularly review their TLs so as to be able to consider new information and the conceptual evolution of the Convention, including as reflected in regular changes to the Operational Guidelines. TLs are in the public domain and can reasonably be considered as indicators of World Heritage interest and efforts.

Table 3 hereafter lists the sites on the current Tentative Lists of the ICIMOD member countries. Selected additional sites are noted despite being located outside HKH, with an explanation of why this was deemed helpful.

Based on the above public information source, Map 6 below visualises the location of the candidate sites on the relevant States Parties’ Tentative Lists in and near the HKH region.

Keeping in mind that there is no formal obligation to submit sites on the TLs under the World Heritage Convention (unless a State Party wishes to nominate in which case the TL is a mandatory prior requisite) and that there can be many reasons for the absence of submissions, the following observations are offered as food for thought:

#### Number of candidate sites by far exceeds inscribed properties

There are 21 candidate sites on the TLs under one or several natural criteria, more than twice the number of properties

Table 3: Candidate sites on the current Tentative Lists proposed under natural World Heritage criteria. States Parties to the World Heritage Convention in the region were considered, mostly coinciding with ICIMOD membership. Tajikistan was added due to mountain ecosystems shared with ICIMOD member countries in parts of the country. Table in alphabetical order by State Party. Properties marked in rows shaded are located outside the HKH as defined by ICIMOD. The areas of buffer zones are provided when applicable and available. Source: UNESCO, World Heritage Centre, see <http://whc.unesco.org/en/tentativelists/>.

Proposed name (Year)	Criteria	Observations
<b>Afghanistan (1)</b>		
Band-E-Amir (2004)	(vii)(viii)(ix)(x)	Located within the HKH region as defined by ICIMOD. The TL entry dated 2004 is restricted to a basic site description.
<b>Bangladesh (0)</b>		
<i>No natural candidate sites, 5 cultural candidate sites submitted in 1999.</i>		
<b>Bhutan (3)</b>		
Bumdeling Wildlife Sanctuary (2012)	(vii)(ix)(x)	Located in the northeast of the State Party at an international border.
Jigme Dorji National Park (2012)	(vii)(ix)(x)	Located in the northwest of the State Party at an international border.
Royal Manas National Park (2012)	(vii)(ix)(x)	Border location next to the inscribed World Heritage property Manas Wildlife Sanctuary, India (see 4.1). Considered relevant for the purpose of this technical assessment despite location just outside HKH according to the ICIMOD definition.
Sakteng Wildlife Sanctuary (2012)	(iii)(v)(vii)(x)	The only mixed candidate site of the State Party, SWS is located in the remote eastern part of the country, likewise along an international border.
<b>China (5)</b>		
Dali Chanshan Mountain and Erhai Lake Scenic Spot (2001)	(n/a)	Mixed candidate site near the southern end of the Hengduan Shan mountain range.
China Altay (2010)	(vii)(viii)(ix)	Part of a renowned transboundary system shared with the Altai Republic in the Russian Federation, Mongolia and Kazakhstan, with existing World Heritage properties.
Dunhuang Yardangs (2015)	(vii)(viii)	Candidate suggested as an aesthetically and geologically outstanding representation of a landscape dominated by Yardangs formed by wind erosion in an extremely arid desert. Note striking similarities with nearby Xinjiang Yardang, likewise added to China's TL in 2015 (see below).
Karakorum-Pamir (2010)	(viii)(x)	A serial candidate site within a region well-known as a transboundary conservation priority of global importance. Note vicinity to, and similarities with, Central Karakorum National Park, on Pakistan's Tentative List since 2016 (see below).
Maijishan Scenic Spots (2001)	(n/a)	A mixed candidate site in Gansu Province.
Qinghai Lake (2017)	(vii)(ix)(x)	Qinghai Lake is an inland saline wetland coinciding with the Qinghai Lake National Nature Reserve.
Scenic and historic area of Sacred Mountains and Lakes (2017)	(iii)(v)(vi)(vii)(viii)(x)	Mixed candidate site in the Tibetan Autonomous Region (TAR).
Taklimakan Desert – Populus euphratica Forests (2010)	(viii)(ix)(x)	Large candidate site with numerous extraordinary geological, geomorphological and ecological features and the particularity of the poplar forest systems enabled by the Tarim River which originates in HKH. Located in Xinjiang, which is partially within HKH.
Xinjiang Yardang (2015)	(vii)(viii)	Note striking similarities with nearby Dunhuang Yardangs, likewise added to China's TL in 2015 (see above). Likewise in Xinjiang, which is partially within HKH.
Yalong, Tibet (2001)	(n/a)	Mixed candidate site on the middle reaches of the Yaluzangbu River.
<b>India (5)</b>		
Cold Desert Cultural Landscape of India (2015)	(iii)(v)(vi)(x)	Candidate site proposed as a serial cultural landscape and a mixed property.

#### 4. Re-visiting natural World Heritage in the Hindu Kush Himalaya

Proposed name (Year)	Criteria	Observations
<b>India (5)</b>		
Garo Hills Conservation Area (GHCA) (2018)	(v)(vi)(viii)(x)	A recent addition to the Indian TL, GHCA is based on another serial mixed approach encompassing several protected areas and reserved forests.
Keibul Lamjao Conservation Area (KLCA) (2016)	(v)(vii)(ix)(x)	A mixed approach in recognition of the ongoing human attachment to Loktak Lake and the surrounding landscape.
Namdapha National Park (2006)	(vii)(ix)(x)	Part of one of Asia's most remote forest areas, the candidate site includes Kamlang Wildlife Sanctuary and Jairampur Forest Division and borders Hukaung Valley Wildlife Sanctuary, on Myanmar's TL since 2014 (see below).
Neora Valley National Park (2009)	(vii)(x)	A relatively small protected area within the Kanchenjunga Landscape (as defined by ICIMOD) and contiguous with several other protected areas and bordering Bhutan's Jigme Khesar Strict Nature Reserve (formerly known as Toorsa Strict Reserve).
Sacred Mountain Landscape and Heritage Routes (2019)	(iii)(vi)(x)	Mixed candidate proposed and subsequently removed from the TL, a reminder of political sensitivities in the region. Not further considered in the analysis.
<b>Myanmar (4)</b>		
Ayeyawady River Corridor (2014)	(x)	Rare World Heritage focus on a roughly 400 kilometre-long stretch of a major free-flowing river, the Ayeyawady River, also known as the Irrawaddy which originates in HKH.
Hkakabo Razi Landscape (2014)	(vii)(ix)(x)	Part of the Northern Mountains Forest Complex and including the highest peak in Southeast Asia, Mt Hkakaborazi (5,881 m a.s.l.). Contiguous with the existing World Heritage property Three Parallel Rivers of Yunnan Protected Areas in China (see 4.1).
Hukaung Valley Wildlife Sanctuary (2014)	(ix)(x)	The largest protected area in Myanmar, HVWS borders Namdapha National Park, on India's TL since 2006 (see above).
Indawgyi Lake Wildlife Sanctuary (2014)	(x)	ILWS was established to conserve the largest freshwater lake in Myanmar, Lake Indawgyi, and surrounding forests and wetlands.
Natma Taung National Park (2014)	(vii)(ix)(x)	Located in western Myanmar, NTNP protects the forested mountains and hills around Mt Natma Taung (3,051 m a.s.l.).
<b>Nepal (0)</b>		
<i>No natural candidate sites, large number of cultural candidate sites</i>		
<b>Pakistan (3)</b>		
Central Karakorum National Park (2016)	(viii)(ix)	CKNP is Pakistan's largest protected area and covers one of the world's two small clusters of mountains above 8,000 m a.s.l., including K2, the world's second highest peak. CKNP is located at an international border. Note vicinity to, and similarities with, Karakorum-Pamir, on China's Tentative List since 2010 (see above). The national park is within HKH, but not formally included in the Hindu Kush Karakorum Pamir Landscape (HKPL) with which the park has minor overlap only.
Deosai National Park (2016)	(ix)(x)	A large national park in a high plateau of northern Pakistan near the Central Karakorum Range.
Ziarat Juniper Forest (2016)	(x)	The largest juniper forest of the country, declared a biosphere reserve in 2013.
<b>(Tajikistan, not a member state of ICIMOD)</b>		
(Fann Mountains) (2016)	(vii)(ix)	Area of conservation interest in this range in western Tajikistan, apparently lacking formal protection status at the time of writing.
(State reserve Dashti Djum) (2006)	(vii)(ix)	State reserve on the slopes of the Hazratishoh Mountains at the meeting point with the Pamirs.
(Tigrovaya Balka) (2006)	(ix)(x)	A nature reserve in the hilly range of the Kashkakum Mountains in the south of the country and along the border with Afghanistan.
(Zakaznik Kusavlisay) (2006)	(vii)(x)	Protected area on the northern slope of the Turkestan Mountains bordering Uzbekistan.
(Zorkul State Reserve) (2006)	(vii)(x)	High altitude lake within an alpine steppe near the Afghan border.



inscribed on the World Heritage List under such criteria in the region. The bulk of candidate sites have been inscribed on the TLs of only three States Parties, China, India and Myanmar. In the case of the two former countries, the effort is in line with longstanding interest in the Convention; in the case of the latter, the submission of the TL in 2014 marks an impressive beginning of efforts to engage in natural World Heritage.

### Strong recent interest in natural World Heritage

Several States Parties have submitted natural candidate sites for the first time ever in recent years. Bhutan added four candidates in 2012, Myanmar seven in 2014, while Pakistan added three sites in 2016. China and India likewise added several sites on their TLs over the last years. While not all of the candidate sites are situated within HKH, this pattern can reasonably be interpreted as a sign of considerable and increased current interest in the Convention on the part of several ICIMOD member countries.

### Two countries without any natural candidate sites

Bangladesh and Nepal are the only States Parties to the Convention in the HKH region without natural World Heritage candidate sites to their TLs. This is fully legitimate, as there is no obligation for any country to submit candidate sites. Further analysis is encouraged in both countries. Afghanistan in turn has one candidate site submitted in 2004.

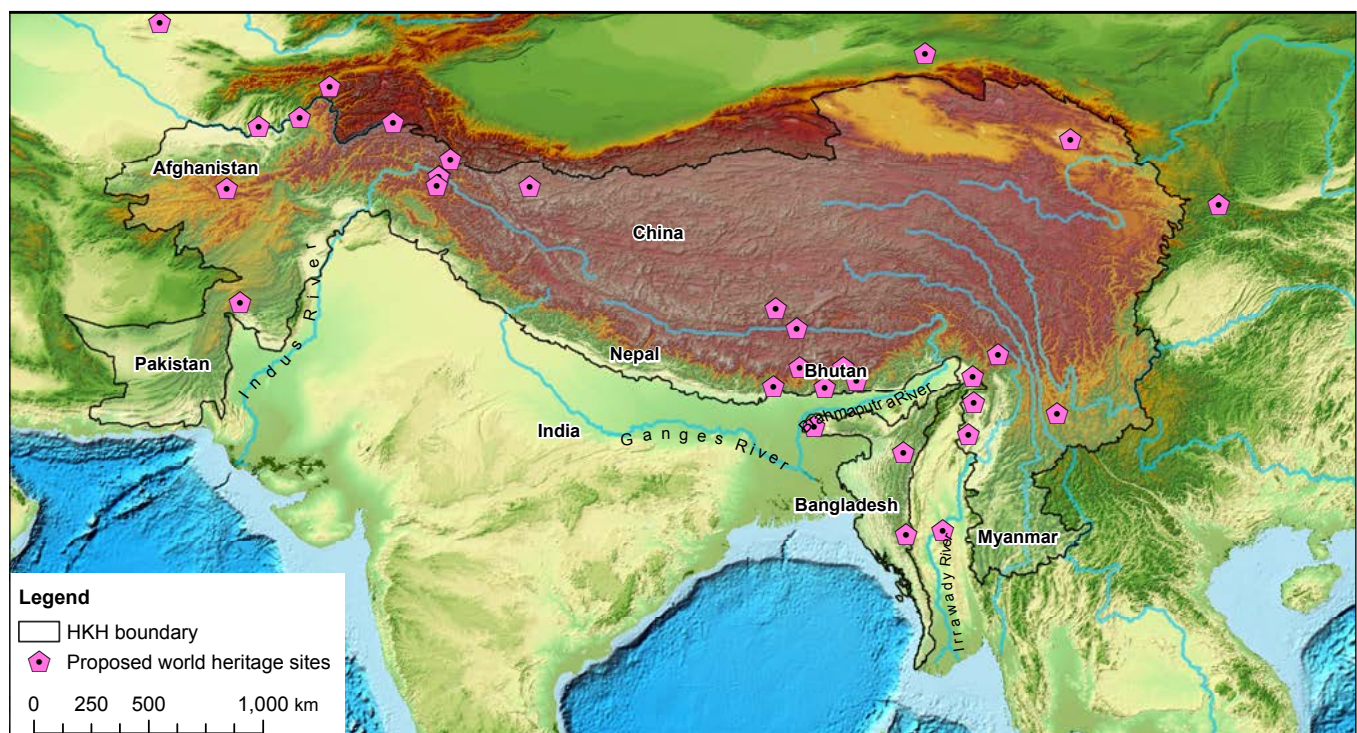
### Emerging interest in mixed approaches and innovative approaches beyond single national parks

In a region which has seen a single inscription of a mixed property only well into the fifth decade of the Convention, it is noteworthy that three out of eight States Parties have proposed a total of seven mixed candidate sites (Bhutan, China, India). In a region without a single natural serial property until 2005, the inscription of several serial candidate sites suggests increasing interest in complex nominations beyond single national parks or comparable

protected areas. It could reflect an increasing recognition that simple, single-site approaches may not meet World Heritage expectations today – especially in large and complex mountain systems. Myanmar has made a highly interesting effort in the recent past, proposing as many as seven candidate sites since 2014, including a rare and innovative proposal of a long stretch of a free-flowing river, the Ayeyawady River Corridor. It deserves to be noted here due to the river's origin in the HKH.

### Conspicuous location on or near borders

In line with the conspicuous border location of many existing World Heritage properties in the HKH, many of the sites inscribed on the TLs show the very same pattern. In several cases, sites border, or are near, existing World Heritage sites in neighbouring countries, or sites on the TLs of those countries. Royal Manas National Park, inscribed on Bhutan's TL in 2012, comes to mind as the natural 'sister protected area' of Manas Wildlife Sanctuary, a World Heritage property since 1985. This has, by the way, been repeatedly recommended by the World Heritage Committee since its 35th session in 2011. As noted earlier, the case of Manas is considered highly relevant and illustrative even though it is formally located just outside the HKH according to the ICIMOD definition. Notwithstanding the need for a more detailed analysis in every single case, from a technical perspective transboundary extensions to existing properties deserve to be considered as a possible alternative to independent nominations of candidate sites in the vicinity of existing properties. Extensions can even be the more promising approach, as it tends to be very challenging to build the case that two sites next to each other can both be considered globally outstanding on their own.



**Map 6:** Sites on the Tentative Lists of the relevant States Parties' Tentative Lists in and near the HKH region.

Source: ICIMOD based on <http://whc.unesco.org/en/tentativelists/>.



# Applying priority-setting schemes and available World Heritage guidance

## 5



## 5.1 Priority-setting schemes without particular reference to World Heritage

International conservation priority-setting exercises conducted over the last decades have regularly focused on biological and ecological values and heritage. They can thus provide valuable hints at potential World Heritage merits under natural World Heritage criteria (ix) and (x), sometimes informally referred to as the 'biodiversity criteria'. However, these are two out of four natural World Heritage criteria only. It is also critically important to recall that compliance with one or several international priority-setting schemes does not necessarily amount to World Heritage merits. For example, the important efforts to identify Key Biodiversity Areas (KBA), which are ongoing in several HKH countries, generate important information. However, not all identified KBAs are among the 'best of the best' in line with World Heritage expectations.

The readily available information tends to offer limited guidance only for criterion (vii), which speaks to superlative phenomena and landscape beauty and the 'geological' criterion (viii). Criterion (vii) was often captured reasonably well in early World Heritage efforts to identify the visually most spectacular sites or sites featuring obvious superlatives, such as Sagarmatha. Interested readers may find specific guidance for criterion (vii) elaborated by Mitchell et al. (2013). As for criterion (viii), it quickly became clear in the early stages of this assessment that there is a lack of readily available and structured information, let alone existing priority-setting.

A first strong hint at the extraordinary conservation significance of the HKH region is the fact that it overlaps with four global biodiversity hotspots, including one within HKH in its entirety (*Himalaya*). Because of the availability of specific information on hotspots contained in the ecosystem profiles facilitated by the Critical Ecosystem Partnership Fund (CEPF), this section starts off with a review of the hotspots, whereas other coarse-filter priority-setting exercises are much more briefly summarised in the table following the discussion of hotspots (Table 5). Note that the above Map 5 visualises the location of the existing World Heritage properties in the HKH against the backdrop of the four overlapping biodiversity hotspots. According to informal ICIMOD analysis, the ten current World Heritage properties in the HKH Himalaya are distributed across the four biodiversity hotspots as follows: three are within the Himalaya hotspot, seven within the Mountains of Southwest China with none within the remaining two hotspots. It should be noted that the latter two hardly overlap with the HKH region.

It cannot be overemphasised that hotspots are commonly defined by a combination of very high biodiversity values and very high threats (see Brooks et al., 2006, Myers et al., 2000, see also 7.4). From the perspective of the World Heritage Convention, the overlap with several hotspots thus not only hints at exceptional importance, but also a high likelihood of severe integrity issues. Today, 36 biodiversity hotspots are recognised by CEPF as the world's most biologically rich and at the same time highly threatened terrestrial regions. According to the CEPF an area must meet the following two strict criteria to qualify as a biodiversity hotspot:

- At least 1,500 endemic species of vascular plants found nowhere else on Earth.
- Loss of at least 70 per cent of its primary native vegetation.

Based on the corresponding ecosystem profiles compiled by CEPF, a brief overview is provided hereafter by hotspot:

### *Himalaya Biodiversity Hotspot (CEPF, 2005)*

It should be noted that the ecosystem profile compiled for the hotspot is not quite up to date and restricted to the Eastern Himalayas. The ecosystem profile determined priority corridors for the Eastern Himalayas to "conserve globally threatened landscape species and large-scale ecological processes", terms close to the very definition of World Heritage criteria (ix) and (x). The ecosystem profile leaves no doubt that the identification of such corridors or conservation complexes is thought to offer the best prospects for the conservation of landscape species and large-scale ecological processes. The ecosystem profile furthermore suggests priority sites outside the corridors. Both the corridors and priority sites outside of them are listed in the subsequent Table 4 and discussed thereafter.

The analysis of the list of sites in the Table 4 is not necessarily exhaustive, as site names may differ and/or protected area names may have changed since 2005. Nonetheless, it is important to emphasise that at least four of the five priority complexes and large-scale priority corridors include natural World Heritage properties and/or sites on the Tentative Lists (TLs) of HKH countries, when including both Kaziranga and Manas for the purpose of technical analysis due to the intricate linkages of both areas with the HKH region. In all cases, the grouping of several protected areas as connected units is a clear reminder that conservation thinking has moved beyond individual protected areas. Following the order in the table, observations from a World Heritage perspective are summarised as follows:

- The Bhutan Biological Conservation Complex includes Bumdeling Wildlife Sanctuary, Jigme Dorji National Park and Royal Manas National Park, all three on Bhutan's TL, as well as Manas Tiger Reserve in India, part of which is inscribed as a World Heritage property under the (legally obsolete) name Manas Wildlife Sanctuary. While recalling the location of the transboundary Manas area just outside HKH according to the ICIMOD definition, it is noteworthy that the ecosystem profile thereby clusters protected areas, which are on the World Heritage List or Tentative Lists as separate units.
- The Kaziranga-Karbi Anglong Landscape includes the namesake Kaziranga National Park in India, a natural World Heritage property since 1985. While also outside the HKH according to the ICIMOD definition, the landscape is mentioned here due to the intricate linkages with the HKH.
- The North Bank Landscape does not overlap with existing World Heritage properties. As far as can be judged from the site names listed in the table, there appears to be no overlap with sites on the TLs either.
- The Kangchenjunga-Singalila-Kanchenjunga Complex includes the two contiguous protected areas culminating in the bi-national peak and a large part of the massif, Khangchendzonga National Park and World Heritage property (India) and Kangchenjunga Conservation Area (Nepal). The nearby Singalila, Barsey and Maenam protected areas are listed under the umbrella of the same corridor.



**Table 4: Priority site and corridor outcomes in the Eastern Himalayas region.** Key criteria and objectives are the conservation of globally threatened landscape species and large-scale ecological processes. The overall disclaimer stated at the beginning of this assessment applies. \*Although Manas Tiger Reserve was included as part of the Manas-Buxa corridor outcome, it is contiguous with the Royal Manas National Park in Bhutan and is considered to be ecologically part of the Bhutan Biological Conservation Complex corridor outcome. The linkages between Royal Manas National Park and Manas Tiger Reserve are stronger than the tenuous links with Buxa and other sites in the Manas-Buxa corridor outcome. Source: CEPF (2005).

Corridor outcome	Sites within the corridor outcome	Landscape species
<b>Bhutan Biological Conservation Complex</b>	Bumdeling, Jigme Dorji, Jigme Singye Wangchuk, Khaling/Neoli, Manas Tiger Reserve*, Phipsoo, Royal Manas*, Sakteng, Sarbhang–Gelephu foothills, Thrumshing La, Toorsa, Phopjika and Khatekha Valleys CA	Tiger, Asian Elephant, Clouded Leopard, Takin, Snow Leopard, Rufous-necked Hornbill
<b>Kaziranga-Karbi Anglong Landscape</b>	East Karbi Anglong & North Karbi Anglong, Garampani and Nambor, Gibbon (Hollongapar), Intanki, Maratlongri and Dhansiri, Kaziranga, Lumding.	Tiger, Asian Elephant, Greater One-horned Rhinoceros, Greater Adjutant, Lesser Adjutant, White-rumped Vulture, Slender-billed Vulture
<b>North Bank Landscape</b>	Barnadi, D'Ering Wildlife Sanctuary, Dibru-Saikhowa, Eagles Nest, Jamjing and Sengagan, Mehao, Nameri, Pakke, Sonai Rupai	Tiger, Asian Elephant, Greater Adjutant, Lesser Adjutant, Rufous-necked Hornbill, White-rumped Vulture, Slender-billed Vulture
<b>Singalila-Kanchenjunga Landscape</b>	Khangchendzonga NP, Kanchenjunga CA, Singalila	Snow Leopard, Takin, Clouded Leopard
<b>Terai Arc Landscape</b>	Royal Bardia, Royal Chitwan, Royal Sukla Phanta, Dang Deukhuri foothills, Parsa	Tiger, Asian Elephant, Greater One-horned Rhinoceros, White-rumped Vulture, Slender-billed Vulture, Lesser Adjutant
<b>Priority sites outside priority corridors*</b>		
	Ada Lake: Pobjika and Khatekha Valleys CA	
	Annapurna CA: Koshi Tappu WR; Makalu-Barun NP	
	Balphakram NP; Buxa; Cherapunjee cliffs, gorges and sacred groves (incl. Mawsmi); Dibang Valley, Dzuka; Jatinga; Khasi Hills (including Shillong Peak NP); Organ National Park; Ripu-Chirang; Rongrengiri; Siju Caves; Sirog; Teesta-Rangit Valley; Tura-Norkrek range (includes NP); Upper Dihing (East) and Kakojan; Upper Renging; Upper Rottung	

- The Terai Arc includes Chitwan National Park, a World Heritage property in Nepal since 1984 (referred to as Royal Chitwan by CEPF), as well as (Royal) Bardia, (Royal) Sukla Phanta, Dang Deukhuri foothills, Parsa and Gaiinda Tal.

If one accepts large corridors and conservation complexes as the approaches offering the best long-term prospects for the conservation of landscape species and large-scale ecological processes, it follows that such places are also of priority interest from the perspective of World Heritage criteria (ix) and (x). Given that there are strong links between the priority conservation complexes and both existing World Heritage properties and sites on the TLs, the CEPF information is highly valuable when it comes to (i) re-visiting existing properties to analyse their potential for possible contiguous or serial extensions and (ii) informing new nominations.

One overarching observation and message emerging from Table 4 is the conspicuous overlap between large-scale priority areas in

the Eastern Himalaya and both existing World Heritage properties and 'candidate sites'. In other words, all of these World Heritage properties and candidate sites are integral parts of much larger areas of highest conservation interest. In addition to the existing properties and sites on the TLs, CEPF identified several priority areas within the same corridors. The implication from a World Heritage perspective is that such areas might have potential as contiguous or serial extensions of existing properties, as well as a basis for the nomination of serial properties or conservation complexes in at least four of the five prioritised corridors.

As for the priority areas identified outside the corridors listed in the above table, some overlap between World Heritage efforts and priority-setting for the hotspot becomes visible. Concretely, Namdapha National Park is both singled out in the ecosystem profile and has been inscribed on India's TL (see 4.2). The Teesta-Rangit Valley priority area, in turn, is close to an inscribed World Heritage property, Khangchendzonga National Park.



From a technical perspective, one of the implications of Table 4 is that it might be useful to re-visit the three above sites on the TL of Bhutan because they are jointly grouped in areas of highest conservation priority. While a welcome confirmation of their significance, it is also a sign that they share many values and attributes and may not be distinct enough to justify separate World Heritage nominations. If the three sites are indeed functionally linked and can reasonably be grouped under the umbrella of a single corridor approach as proposed by CEPF, perhaps a serial approach rather than three separate sites might be the more promising World Heritage nomination approach. In light of the CEPF priorities, it can reasonably be argued that Jigme Singye Wangchuk may merit further consideration as a possible candidate site on the TL of Bhutan.

### **Mountains of Southwest China (CEPF, 2012a)**

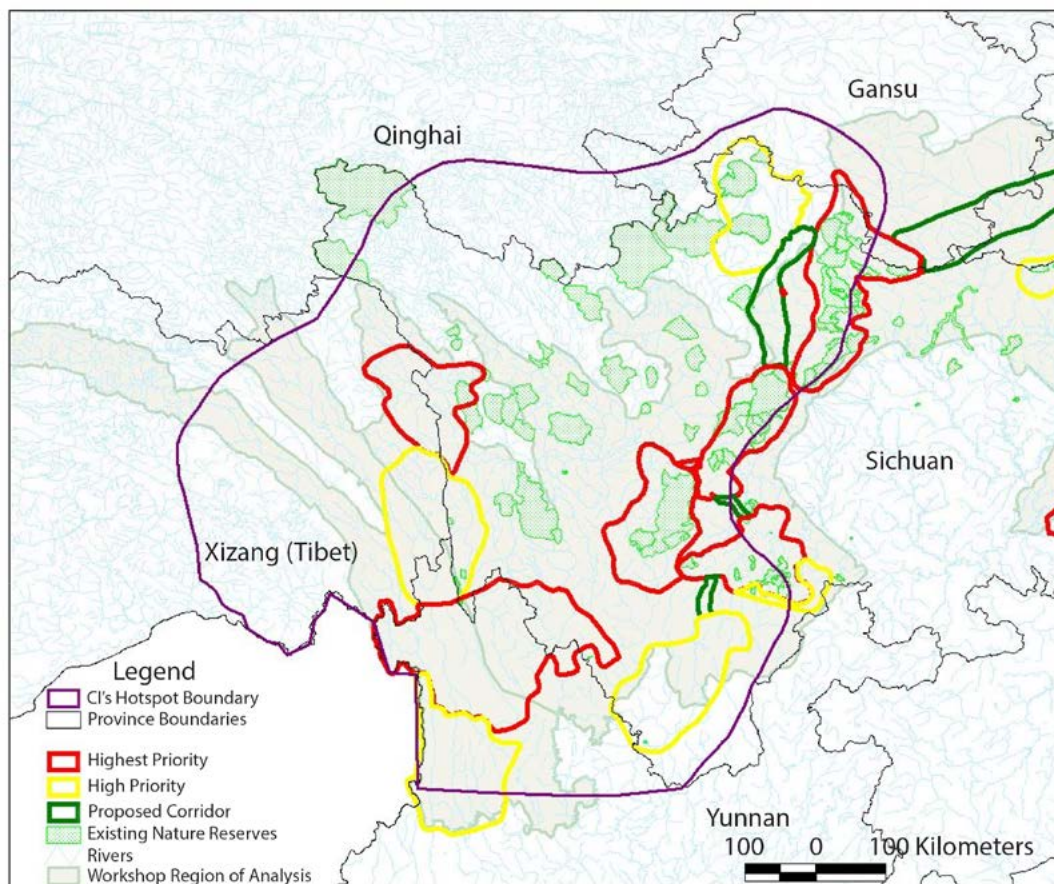
This hotspot extends across parts of the transition between the Chengdu Basin and the Tibetan Plateau, politically including Yunnan Province, parts of western Sichuan Province, the eastern portions of the Tibetan Autonomous Region (TAR), the southeast tip of Qinghai Province and the southern tip of Gansu Province, thereby substantially overlapping with HKH. The hotspot is an impressive example of the coincidence of unique biological and cultural diversity. CEPF (2012a) describes the hotspot as the “most biologically diverse temperate forest ecosystem in the world”. It is perhaps the world’s botanically richest temperate region, while it is also home to numerous ethnic groups, cultures and languages. The hotspot overlaps with three Global 200

ecoregions, all of which are forest ecosystems. Scientists have so far recorded an impressive 12,000 higher plants, almost a third of which are endemic to the hotspot. One explanation offered by CEPF for the extreme species richness is the unique combination of topographic complexity and what the authors refer to as a ‘moisture trap’.

The CEPF ecosystem profile determined several areas of highest conservation priorities for the Upper Yangtze basin, as shown in the subsequent map.

These highest priorities partially overlap with existing World Heritage properties. Namely, one of the highest priority areas roughly coincides with the Three Parallel Rivers of Yunnan Protected Areas (TPR), which also constitutes the meeting point with the two contiguous Himalaya and Indo-Burma hotspots. Additional high priority areas extend both to the north and the south. Further north of TPR, another highest priority area was singled out, along the three rivers giving TPR its name, where the Upper Yangtze (Jinsha) forms the border between Sichuan Province and the TAR.

There is also overlap between another highest priority area to the east of the Upper Yangtze basin and the three natural World Heritage properties in Sichuan Province. This area, according to CEPF, is part of a series of highest priority areas, extending south of the three properties inscribed in Sichuan. In all cases, the determination of areas of highest conservation interest reveals



**Map 7: Biodiversity conservation priorities in the Upper Yangtze in the Mountains of Southwest China Biodiversity Hotspot.** Note that the map and analysis cover part of the hotspot only. The overall disclaimer stated at the beginning of this assessment applies. Source: CEPF (2012a).

a relationship with existing World Heritage properties. While the level of detail provided by CEPF does not permit a conclusive judgement, the existing properties all appear to be embedded in much larger highest priority areas. If confirmed, this would imply a potential for extensions, especially as regards the relatively small properties in Sichuan. The highest priority areas identified by CEPF, located within both HKH and the biodiversity hotspot deserve in-depth analysis to inform decision-making both in terms of possible new nominations and contiguous or serial extensions to existing properties.

### **Indo-Burma (CEPF, 2012b)**

This hotspot is the southernmost of the four hotspots under consideration for this assessment. Most of it extends south of the HKH across much of Southeast Asia and Southern China. However, it also encompasses some of the eastern extensions of the Himalaya. The highest point is Mt Hkakabo in Myanmar, the heart of the Hkakabo Razi Landscape on the TL of Myanmar. Several of Asia's major rivers link the hotspot with the Mountains of Southwest China hotspot to the north, as well as to the Himalaya hotspot.

Of the multiple countries within this biodiversity hotspot, only China and Myanmar are directly relevant from a HKH perspective. The TPR serial property in Yunnan, China, has a vast north-east extension. While mostly within the Mountains of Southwest China hotspot, it transitions into the Indo-Burma hotspot at its southernmost and westernmost edges along the border with Myanmar, known as the Gaoligongshan Subarea, covering large parts of the Gaoligongshan range. Both to the south in China and to the west in Myanmar, the forests of TPR descend to lower elevations, where they are often lacking formal protected area status. The conservation and eventual World Heritage consideration of such areas could further add to the already impressive altitudinal gradient and diversity of forest types, perhaps extending TPR or as potential new nominations.

As for Myanmar, several rivers are among the suggested priorities, including several stretches of the Ayeyawady or Irrawaddy River. This is in line with the corresponding candidate site on the State Party's TL dedicated to a part of the Ayeyawady despite its location outside HKH as defined by ICIMOD. Out of the very large number of Key Biodiversity Areas, CEPF prioritised only four 'priority corridors'. While none is located within HKH, one corridor focuses on stretches of the Mekong River (Lancang) and its major tributaries. While the areas under consideration are downstream of the HKH according to the ICIMOD definition, the source of the Mekong is in the Tibetan Plateau and part of the upper Mekong crosses between components of the TPR property.

Tantipisanuha et al. (2016) conducted an analysis of the protected areas in the Indo-Burma hotspot in order to identify gaps and high priority areas for increasing biodiversity representation based on irreplaceability and vulnerability. Two results deserve to be mentioned: first, while four of the five largest high priority sites are in countries outside the HKH region, one, a stretch of the Ayeyawady River, is located in Myanmar. Even though the level of detail provided does not permit a conclusive judgement,

it is noteworthy that a stretch of the Ayeyawady River is on the TL of Myanmar (Ayeyawady River Corridor), albeit outside HKH. Second, one of the largest gaps in the protected area system of Myanmar (at the time of the CEPF analysis) is located along the border between Myanmar and China in the vicinity of the TPR World Heritage property.

### **Mountains of Central Asia (CEPF, 2017)**

For the sake of completeness, this fourth hotspot is mentioned despite its modest overlap with HKH. The ecosystem profile highlights two relevant areas as follows:

- Wakhan National Park in Afghanistan, the country's largest Key Biodiversity Area (KBA), is suggested as one of 28 CEPF priorities. The remote national park is the place where the mighty Amu Darya River originates and part of one of five priority corridors identified by CEPF, the Pamir-Alai and Wakhan Mountains corridor. Wakhan National Park is also an integral part of the Hindu Kush Karakoram Pamir Landscape promoted by ICIMOD as one of several transboundary landscape initiatives.
- The Pamir Plateau Nature Reserve is noted as one of 14 KBAs in China within the hotspot, but not among the CEPF priorities.

With the noteworthy exception of Wakhan National Park, which merits a closer look as a possible candidate site, the ecosystem profile for the Central Asian Mountains is a valuable and up-to-date source when comparing possible World Heritage sites in the HKH with other candidate sites in the nearby Central Asian mountain ranges, outside of, but sharing features with, HKH. Interested readers may in addition wish to consult Lethier (2019) and Magin (2005).

Besides the quite detailed hints at sites of global biodiversity significance contained in the above ecosystem profiles for the four biodiversity hotspots under consideration, the following coarse-filter priority-setting exercises were considered. They are presented and briefly discussed in the subsequent Table 5.

The references discussed in Table 5 are recommended as helpful sources of information when engaging in national level TL listing, regional harmonisation of TLs and/or nomination processes. They can help identify areas, but also put them in perspective in comparative analyses, mandatory exercises in any revision of Tentative Lists and nomination initiative. It should not be forgotten that the very same references play an important role in the independent technical evaluations, which all World Heritage nominations are subject to.

The most obvious broad World Heritage gap emerging from CEPF information on the four global biodiversity hotspots are large and intact, yet highly threatened, forest areas in Myanmar, at the northwestern tip of the Indo-Burma hotspot. It can be argued that the TPR property in Yunnan, China, amounts to some World Heritage coverage of the Indo-Burma hotspot, but most of TPR is in fact located in the Mountains of Southwest China hotspot. There are strong indications of natural World Heritage potential at the meeting point of these two hotspots, which overlaps with the HKH. The relatively recent revisions of

**Table 5: Schematic application of priority-setting schemes. Noteworthy sites and locations highlighted in bold. Source: Author, based on sources provided in table.**

Scheme and reference(s)	Observations / Comments
<b>Megadiverse Countries (Mittermeier et al., 1997)</b>	According to the definition by Mittermeier et al. (1997), both China and India are among the world's 17 megadiverse countries; both China and India are among the 12 signatories of the 2002 Cancun Declaration of like-minded Megadiverse Countries. To qualify, a country must have at least 5,000 of the world's plants as endemics within its territory. Butler (2016) compared the 17 countries concluding that China and India globally rank fourth and eighth, respectively. As the territory of both countries by far exceeds their territories within HKH, recognition as a megadiverse country per se does not amount to a direct confirmation of natural World Heritage potential within HKH. Nonetheless, the overlap between megadiverse countries and HKH is highly relevant from the perspective of the World Heritage Convention, in particular as regards criteria (ix) and (x).
<b>High-Biodiversity Wilderness Areas (HBWA) (Brooks et al., 2006, UNEP-WCMC, 2002)</b>	HKH does not overlap with any of the world's HBWA.
<b>Global 200 priority ecoregions (Olson &amp; Dinerstein, 2002 and Olson et al., 2000)</b>	An impressive 30 of the world's 238 Global 200 overlap with HKH, as detailed in Annex 8.4. ICIMOD analysis suggests that 62% of the HKH is covered by the Global 200 ecoregions, but only 18% of the ecoregions are represented in the 17 existing World Heritage properties. This is a clear hint at limited World Heritage coverage of global conservation priorities within HKH.
<b>The freshwater Global 200 Ecoregions (Olson et al., 2000)</b>	<p>This approach distinguishes large rivers, large river headwaters, large river deltas, small rivers, large lakes and small lakes. In order of these categories, the following ecoregions belong to the world's 53 priority freshwater ecoregions:</p> <p><b>Mekong River:</b> while referring to parts of the river south of HKH, the river's origin in – and large stretches of it – within HKH (Lancang River) are noteworthy. The same holds true for <i>Yangtze River and Lakes</i>, as well as for the <i>Indus River Delta</i>.</p> <p><b>Salween River (Nujiang):</b> part of the upper river is within the Three Parallel Rivers of Yunnan Protected Areas World Heritage property (TPR) in China.</p> <p><b>Inle Lake, Myanmar:</b> The lake is classified as a distinct freshwater region on its own; it is surrounded by the Salween freshwater region. Note that the lake has been on Myanmar's Tentative List since 1996 under cultural criteria.</p> <p><b>Yunnan Lakes and Streams, China:</b> The lakes and streams are located within the Yunnan Plateau subtropical evergreen forests ecoregion. While inconclusive from the level of detail provided in the publication, overlap with TPR is assumed.</p>
<b>Key Biodiversity Areas (KBAs) (Langhammer et al., 2018)</b>	As can be expected in a region overlapping with four of the world's hotspots, a very large number of KBAs has been identified within HKH. A full appreciation of the individual KBAs is beyond the scope of this assessment. The use of this data source is strongly encouraged when engaging in revisions of Tentative Lists and/or nominations. Bhutan, for example, conducted a national level KBA exercise in early 2019. Ongoing work to refine the identification of KBAs in Bhutan and Myanmar deserve full consideration from a World Heritage perspective. When using KBA data, the number of trigger species, the number of KBA criteria met, size and intactness can offer helpful guidance for comparisons.



Scheme and reference(s)	Observations / Comments
<p><b>Endemic Bird Areas (EBAs, BirdLife International, 2019)</b></p>	<p>BirdLife defines EBAs as regions of the world where the distributions of two or more of restricted-range bird species overlap, restricted range being an area smaller than 50,000 square kilometres. In the HKH region, the following EBAs are of note:</p> <p>Afghanistan has an EBA named <b>Afghanistan Mountains</b> and is otherwise part of the <b>Western Himalayas EBA</b>. The Western Himalayas EBA also extends into Pakistan.</p> <p>Parts of Bangladesh and Bhutan are within the <b>Eastern Himalayas EBA</b>, recognised due to a large number of restricted range species. The EBA extends across parts of China, India, Myanmar and Nepal.</p> <p>Many of China's 14 EBAs overlap with HKH: <b>Central Sichuan Mountains</b> (contiguous with another EBA to the south, <b>Chinese Subtropical Forest</b>); the above-noted Eastern Himalayas; <b>Eastern Tibet</b>; <b>Northern Qinghai-Tibetan Plateau</b>; <b>Qinghai Mountains</b>, <b>Southern Tibet</b>; <b>West Sichuan Mountains</b>; and <b>Yunnan Mountains</b>.</p> <p>Parts of three EBAs overlap with the Indian part of the HKH: Eastern Himalayas, Southern Tibet and Western Himalayas.</p> <p>The EBAs in Myanmar include parts of the above-mentioned Eastern Himalayas and Yunnan Mountains, as well as <b>Irrawaddy Plains</b>, <b>Myanmar-Thailand Mountains</b> and <b>Northern Myanmar Lowlands</b>.</p> <p>Nepal is part of three EBAs: Central Himalayas, Eastern Himalayas and Western Himalayas.</p>
<p><b>Centres of Plant Diversity (CPD) (Davis &amp; Heywood, 1995, see also Bertzky et al., 2013 and Mutke et al., 2011)</b></p>	<p>CPD globally stand out for plant conservation, but are also proxies for biodiversity more broadly. Ignoring islands for the purpose of this assessment, they are defined by a plant species richness exceeding 1,000, of which at least 10% are endemic to the site or phytogeographic region. In their review of Asia, the authors identified the following CPD in what they refer to as the Indian Subcontinent, sites added in brackets:</p> <p>Irano-Turanian Regional Centre of Endemism (<b>Kashmir Himalaya, Nanda Devi</b>).</p> <p>Eastern Asiatic Regional Centre of Endemism (<b>Northern Sikkim and East Nepal, Namdapha, Natma Taung</b> / Mount Victoria, <b>Rongklang</b> / Chin Hills, <b>North Myanmar</b>, the latter being contiguous with Namdapha).</p> <p>(Sundarbans).</p> <p>Note that Davis and Heywood (1995) provide data sheets for some, albeit not all, of the CPD of the region, for example for Nanda Devi, Namdapha and Northern Myanmar.</p> <p>The regional overview by Davis and Heywood (1995) is strongly recommended as a most valuable source of information beyond the scope of this assessment.</p> <p>In their global review of World Heritage potential according to 'biodiversity criteria' (ix) and (x), Bertzky et al. (2013) used CPDs as a complementary dataset to identify broad 'biodiversity gaps' on the World Heritage List. The authors noted the CPD in Myanmar as lacking World Heritage coverage at the time of writing.</p> <p>Mutke et al. (2011) produced a global map of species richness of vascular plants highlighting the 20 centres of highest richness. Much of HKH overlaps with two contiguous centres, referred to by the authors as Himalaya and Indochina-China, respectively. They are classified in the second and third highest 'diversity zones' (DZ) worldwide, defined by the authors by 4,000–5,000 species per 10,000 square kilometres (DZ 8) and more than 5,000 species (DZ 9), respectively.</p>

Scheme and reference(s)	Observations / Comments
Important Bird and Biodiversity Areas (IBAs, BirdLife International, 2019)	Due to the very large number of IBAs in the HKH, it was not possible to analyse the data compiled and provided by BirdLife International. It is clear that IBA status per se is not an indication of possible World Heritage merits. However, the rich database may well contain hints at potential candidate sites, for example from the perspective of exceptionally large migration or breeding aggregations (IBA Criterion A4: Congregations). A full appreciation of the individual IBAs is beyond the scope of this assessment. The use of the data source is strongly encouraged when engaging in revisions of Tentative Lists and/or nomination efforts. As in the case of KBAs, the number of trigger species, number of IBA criteria met, area and intactness can serve as useful guidance to put IBAs in global perspective.
Intact Forest Landscapes (IFL) (Potapov et al., 2008)	An IFL is defined by Potapov et al. (2008) as a “seamless mosaic of forest and naturally treeless ecosystems within the zone of current forest extent, which exhibit no remotely detected signs of human activity or habitat fragmentation and is large enough to maintain all native biological diversity, including viable populations of wide-ranging species”. The latest available data show a very small number of IFLs in the central and western Himalaya. To the southeast of HKH, there is a <b>globally conspicuous cluster of IFLs, covering substantial parts of Bhutan and northeastern India and extending east into southwest China and south into Myanmar.</b>
Alliance for Zero Extinction sites (AZE) ( <a href="http://www.zeroextinction.org">http://www.zeroextinction.org</a> )	<p>The alliance works to identify and safeguard the most important sites for preventing global extinctions, i.e. those that have highly threatened species restricted to just a single site in the world. Some sites are triggered by a single species and it is worth noting that World Heritage nominations based on single species are typically discouraged and rarely successful. Other AZEs are triggered by multiple species. However, AZE status per se is not necessarily a strong indication of World Heritage potential. Nonetheless, AZE status can be a useful indication of conservation importance beyond the species triggering the status. Within HKH, the following nine AZE sites have been identified according to the listed trigger species:</p> <p><b>Chamba Valley, India:</b> Endangered Kashmir gray langur (<i>Semnopithecus ajax</i>).</p> <p><b>Eaglenest and Sessa Sanctuaries, India:</b> Critically endangered bird species Bugun liocichla (<i>Liocichla bugunorum</i>)</p> <p><b>Namdapha-Kamlang, India.</b> Critically endangered Namdapha flying squirrel (<i>Biswamoyopterus biswasi</i>).</p> <p><b>Manas National Park, India:</b> Critically endangered pygmy hog (<i>Porcula salvania</i>).</p> <p><b>Htamanthi, Myanmar:</b> Critically endangered Burmese roofed turtle (<i>Batagur trivittata</i>).</p> <p><b>May Hka Area, Myanmar:</b> AZE Critically endangered Myanmar snub-nosed monkey (<i>Rhinopithecus strykeri</i>).</p> <p><b>Dulong Jiang River Valley and Three Parallel Rivers of Yunnan Protected Areas, China:</b> Endemic birch (<i>Betula gynoterminalis</i>) and a conifer of the yew family (<i>Cephalotaxus lanceolata</i>).</p> <p><b>Puxiong in Yuexi County, China:</b> Critically endangered Liangbei toothed toad (<i>Oreolalax liangbeiensis</i>).</p> <p><b>Muli (Ma'an Shan), China:</b> Endangered Muli cat-eyed toad (<i>Scutiger muliensis</i>).</p> <p>Two out of nine AZE thus overlap with existing World Heritage properties, Three Parallel Rivers (China) and Manas National Park (India). A third AZE overlaps with Namdapha National Park, on India's Tentative List since 2006.</p>

the Tentative List of Myanmar constitute a promising beginning in this regard by putting a World Heritage spotlight on some of the forests under consideration. Areas of highest conservation priority in the Mountains of Southwest China hotspot suggest potential for possible extensions of the various existing sites in Yunnan and Sichuan or perhaps even new independent nominations.

Technically, there is no World Heritage coverage of the overlap between HKH and the Mountains of Central Asia hotspot. This, however, must be seen in light of the fact that most of the hotspot is outside HKH. Wakhan National Park (Afghanistan), along with several contiguous protected areas in China, Pakistan and Tajikistan jointly forming the heart of the Hindu Kush Karakoram Pamir Landscape (HKPL) promoted by ICIMOD, reaches into the hotspot. Concretely, only Zorkul Nature Reserve (on the TL of Tajikistan, which is not an ICIMOD member country) is within the Mountains of Central Asia hotspot. However, from a technical perspective, this should not discourage a closer look. Within the Himalaya hotspot, the areas covered by the small number of World Heritage properties do not include large areas of the westernmost HKH region and large areas of northeastern India. The identification of both conservation corridors or complexes and additional individual sites suggests potential for contiguous or serial extensions of existing properties and possibly new nominations.

Other international priority-setting exercises consistently confirm the importance of existing properties, while providing valuable hints at additional candidate sites, both for possible extensions and possible new nominations, as listed in chapter 6.

### 5.2 Regional and thematic World Heritage studies

Facilitated by IUCN in most cases, a series of regional and thematic World Heritage studies have been elaborated, often, but not always, at the request of the World Heritage Committee. Helpful hints contained in these studies are synthesised below.

The above references are highly recommended as indispensable sources of information when engaging in natural World Heritage initiatives. Extracting key information from Table 6, the below broad gaps and hints at sites of possible World Heritage potential emerge. They merit further consideration when engaging in revisions of Tentative Lists, extensions of existing World Heritage properties and/or new nominations:

- **Cold winter deserts** are identified as a broad gap in global World Heritage coverage, as are both the **Eastern and the Western Himalayan Broadleaf and Conifer Forests**, which are among the Global 200. Potential is also suggested for the **Northeastern India and Myanmar Hill Forests** (Bangladesh, India, Myanmar).
- From the perspective of desert features, **Band-E-Amir** (Afghanistan) and **Hunza Valley** in the Karakoram Mountains of Pakistan are of note according to the corresponding thematic study.
- Several existing properties may offer potential for contiguous or serial extensions, in some cases possibly

across national borders. They include, in no particular order: **Jiuzhaigou Valley Scenic and Historic Interest Area** (China), **Sagarmatha** (Nepal) and the repeatedly mentioned bi-national **Manas** area (India and Bhutan) just outside of HKH. The same holds true for the **Sichuan Giant Panda Sanctuaries – Wolong, Mt Siguniang and Jiain Mountains, Huanglong Scenic and Historic Interest Area** and the **Three Parallel Rivers of Yunnan Protected Areas**, which are situated within much larger landscapes of highest conservation significance.

- **Sanjiangyuan** on the Tibetan Plateau and the **Yaluzangbudaxiagu Nature Reserve** within the Eastern Himalayan Broadleaf and Conifer Forests (both China) deserve a closer look; both are concretely recommended as possible nominations in one specific study according to World Heritage criteria (ix) and (x).
- While beyond the scope of this assessment, fossil sites of note identified in a specific thematic study comprise **Maya** (Gansu) and **Yangtze Gorge** (both China), as well as sites in the **Siwaliks** (India).

### 5.3 Review of specific regional analyses

#### 5.3.1 Analysis of protected area coverage in the region

This section draws on a peer-reviewed analysis of the protected area coverage in the HKH by Chettri et al. (2008). The lead author of the analysis also served as the ICIMOD focal point for the project to which this assessment contributes. The authors re-visited and updated the published analysis for the purpose of the international workshop. As of 2019, a total of 517 protected areas were formally designated against 488 in 2008. The subsequent Figure 5 shows an enormous increase in the number and area of protected areas in the region over the last 100 years. A strong and steady increase over several decades appears to have peaked in the 2000s. The increase in the protected area estate between 2008 and today continued the long increasing trend, but has markedly lost momentum when compared to earlier decades.

According to the revised analysis, there continue to be important gaps in terms of protected area coverage in the region. This is important to keep in mind, as in principle there could be areas of potential World Heritage calibre without formal protection. One such gap was confirmed once more for the northeastern Indian states in the Eastern Himalaya. According to personal communication, the authors do not consider the current total of 17 properties located within HKH an adequate representation of the overwhelming natural and cultural wealth of the region. While the modest overall number of transboundary World Heritage properties shows the globally limited implementation of the remarkable mandate of the Convention in this regard, the HKH epitomises the limited implementation. Furthermore, almost 40% of HKH is under formal protection with exceptionally rich culture, biodiversity and often high degrees of endemism.

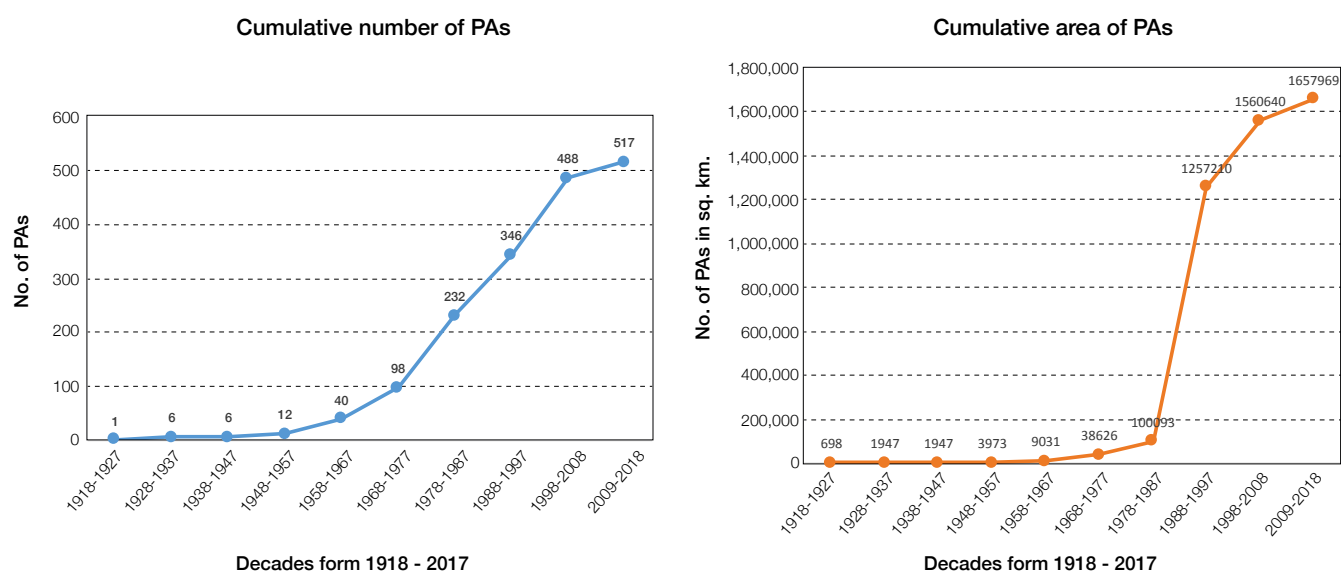
Chettri et al. (2008) also stressed the substantial overlap between HKH and both the biodiversity hotspots and the Global 200 noted in earlier sections. They plausibly argue that this World Heritage potential remains to be better understood. Indeed,



**Table 6: Schematic application of regional and thematic World Heritage studies. Studies are listed in chronological order, starting with the most recent. Source: Author, based on sources provided.**

Focus and reference	Results / Comments / Observations
<b>World Heritage volcanoes (Casadevall et al., 2019)</b>	As one would expect in light of its geological origin, HKH does not emerge as a regional gap or priority from the perspective of volcanism. Mount Popa in Myanmar, outside HKH, is noted by the authors as “worthy of consideration”.
<b>Central Asia (Lethier, 2019)</b>	This recent study contains valuable information on the neighbouring mountain ranges, which can be used for comparisons with HKH. No specific hints at World Heritage gaps or priorities in the small areas overlapping with HKH.
<b>Terrestrial biodiversity (Bertzky et al., 2013)</b>	<p>Sites deserving consideration are discussed according to a wide range of priority-setting exercises with a focus on criteria (ix) and (x). Tested against the Global 200, the authors highlight the absence of World Heritage properties in both <b>the Eastern and the Western Himalayan Broadleaf and Conifer Forests</b>, two of the Global 200. The recent inscription of Khangchendzonga National Park (India) can be regarded as partially filling this gap in the Eastern Himalaya.</p> <p>Table 4.1 in the publication proposes the arguably most tangible recommendations based on irreplaceability for species conservation. Two sites with exceptional irreplaceability are the inscribed properties of <b>Sichuan Giant Panda Sanctuaries – Wolong, Mt Siguniang and Jiajin Mountains</b> and <b>Three Parallel Rivers of Yunnan Protected Areas</b> (both China).</p> <p>Furthermore, the two following sites are recommended for further consideration as possible nominations:</p> <p><b>Sanjiangyuan</b>, literally meaning ‘Source of Three Rivers’, on the Tibetan Plateau in Qinghai Province (China). Home of the sources and headwaters of three major Asian rivers, the Yellow River (Huanghe), Yangtze (Jinsha) and Lancang (Mekong). Parts of the area were protected as the Sanjiangyuan National Nature Reserve (SNNR), also called the Three Rivers Nature Reserve. The site is reportedly in the process of becoming Sanjiangyuan National Park (SNP). The vast site was approved in 2015 by the Chinese Government as a pilot area for the ongoing creation of a national park system and scheduled for formal declaration as Sanjiangyuan National Park in 2020.</p> <p><b>Yaluzangbudaxiagu Nature Reserve</b>, likewise in China, is located within the Eastern Himalayan Broadleaf and Conifer Forests according to Global 200 terminology.</p>
<b>Desert landscapes (Goudie &amp; Seely, 2011)</b>	<p><b>Band-E-Amir</b>, Afghanistan is shortlisted as being “of particular note” among sites “which may have potential to demonstrate OUV”, with a likely focus on criterion (viii) and possibly criterion (vi).</p> <p>The <b>Hunza Valley</b> in the Karakoram Mountains of Pakistan is one of globally nine sites for which “a strong case can be made that all these sites have superlative geomorphological value and include many types of desert geomorphological phenomena for which there are as yet no good examples in the World Heritage List”.</p>
<b>Caves and karst (Williams, 2008)</b>	The author points to a poor World Heritage coverage of karst terrains located in arid to semi-arid environments in the tropics and subtropics, including in Central Asia and the Southern Hemisphere, while not providing any hints at World Heritage potential in HKH.
<b>Geological framework (Dingwall et al., 2005)</b>	Rather than recommending potential sites, the authors propose a structured framework for their systematic identification. The publication is strongly recommended as food for thought for readers interested in unpacking criterion (viii) applied to the HKH region.
<b>Forests (UNESCO, 2005)</b>	Annex 3 of the publication summarises various efforts to identify priority forest regions. Possible World Heritage potential within the HKH is suggested for the <b>Northeastern India and Myanmar Hill Forests</b> (Bangladesh, India, Myanmar), including <b>Manas</b> , just outside HKH, citing the original source of information (CIFOR, 1999, see below).
<b>Global review (UNEP-WCMC et al., 2004)</b>	<b>Cold winter deserts</b> are identified as a broad global gap at the level of biomes, as defined by Udvardy (1975).
<b>Central Asia (Magin, 2005)</b>	While substantially updated by Lethier (2019), the study continues to provide a wealth of useful information, to be considered, for example, in comparative analyses. The small number of recommended sites with possible World Heritage potential does not encompass sites within HKH.

Focus and reference	Results / Comments / Observations
<b>Mountains (Thorsell &amp; Hamilton, 2002)</b>	The guidance includes “suggestions for additional mountain protected area nominations to the World Heritage List”. It is suggested that one site previously deferred may merit re-submission, the <b>Central Karakorum</b> in Pakistan. The concrete recommendation is to “re-formulate and consider including the adjacent <b>Siachen area in India and protected zone on Chinese side</b> ”. Three existing properties “where boundary extensions should and are being considered” are listed as follows: <b>Jiuzhaigou/Huanglong</b> , China, to “merge with additional area of Minshan”. <b>Sagarmatha</b> in Nepal to “adjoining Makalu Barun NP and Chinese side of Mt. Everest (Zhu Feng (Qomolangma) Nature Reserve).” <b>Royal Manas</b> , Bhutan, as “contiguous habitat with Manas NP, India”.
<b>Biodiversity (Smith &amp; Jakubowska, 2000)</b>	No specific hints at World Heritage potential in HKH is offered by the author.
<b>World Heritage forests (CIFOR et al., 1999)</b>	The paper contains a worldwide list of 63 “potential forest sites for consideration for World Heritage nomination”. Many of these are located in Asia and encompass the <b>Northeastern India and Myanmar Hill Forests</b> (Bangladesh, India, Myanmar), including <b>Royal Manas National Park</b> , Bhutan (see UNESCO, 2005).
<b>Wetlands and marine (Thorsell et al., 1997)</b>	The overview contains an explicitly non-exhaustive list of “prospective wetland (...) areas with potential for World Heritage inscription”. A single one, the Irrawaddy River floodplain and delta in Myanmar, deserves to be noted in the context of HKH.
<b>Fossils (Wells, 1996)</b>	While primarily proposing a contextual framework, the author lists two “fossil sites of potential World Heritage value”: <b>Maya (Gansu) and Yangtze Gorge</b> (both China and both as representations of Ediacaran Metazoans, Precambrian). <b>Siwaliks</b> (India, for mammals including primates, Miocene).
<b>The world’s greatest natural areas (IUCN, 1982)</b>	While obviously outdated, the publication is noteworthy as the first systematic attempt at a global overview of sites of natural World Heritage potential. It includes several sites which deserve to be mentioned in the context of HKH: <b>Wengchun Wolong Nature Reserve, Three Gorges of the Yangtze, Ice Forests of Mt Qomolangma</b> (China); <b>Manas</b> (Bhutan and India), <b>Kaziranga, Nanda Devi</b> (India); <b>Royal Chitwan</b> (Nepal). Remarkably, most sites have since been inscribed. Mt Qomolangma is the Tibetan name for Sagarmatha (Mt Everest), of which the Nepalese side has been inscribed. Due to the massive hydropower development, the once spectacular Three Gorges of the Yangtze have obviously lost their World Heritage potential.



**Figure 5: Trends over a century of formal protected areas in the region. Trend in number and area coverage from 1918 to 2019. Source: ICIMOD, 2019 based on Chettri et al. (2008), updated by Nakul Chettri, Kabir Uddin and Sunita Chaudhary for the international workshop linked to this assessment. While the trends are accurate and considered significant, it should be noted that some of the underlying data is under current revision by ICIMOD to address minor inconsistencies between data used.**

**Table 7: Ecoregions in the HKH with ‘globally outstanding’ biodiversity. Based on a comprehensive regional conservation assessment conducted in 2002. Source: Author, based on Wikramanayake et al. (2002).**

#	Ecoregion	Bioregion / Biome type	Conservation status
1	<b>Meghalaya subtropical forests</b>	Indian subcontinent / Tropical and subtropical moist broadleaf forests	Vulnerable
2	<b>Eastern Himalayan subalpine conifer forests</b>	Indian subcontinent / Temperate coniferous forests	Vulnerable
3	<b>Terai-Duar savanna and grasslands</b>	Indian subcontinent / Tropical and subtropical grasslands, savannas and shrublands	Critical
4	<b>Eastern Himalayan broadleaf forests</b>	Indian subcontinent / Temperate broadleaf and mixed forests	Relatively stable/Intact
5	<b>Eastern Himalayan alpine shrub and meadows</b>	Indian subcontinent / Montane grasslands and shrublands	Relatively stable/Intact
6	<b>Kayah-Karen montane rain forests</b>	Indochina / Tropical and subtropical dry broadleaf forests	Relatively stable/Intact
7	<b>Northern Triangle subtropical forests</b>	Tropical and subtropical moist broadleaf forests	Relatively stable/Intact
8	<b>Northern Triangle temperate forests</b>	Temperate broadleaf and mixed forests	Relatively stable/Intact
9	<b>Mizoram-Manipur-Kachin rain forests</b>	Indochina / Tropical and subtropical moist broadleaf forests	Vulnerable
10	<b>Central Indochina dry forests</b>	Indochina / Tropical and subtropical dry broadleaf forests	Vulnerable
11	<b>Northern Indochina subtropical forests</b>	Indochina / Tropical and subtropical moist broadleaf forests	Vulnerable

the HKH overlaps with numerous Global 200 ecoregions. While the existing World Heritage properties cover some of these ecoregions of highest priority, many are not covered by World Heritage. While location in a Global 200 ecoregion of course offers no guarantee for World Heritage potential, there is every reason to analyse such ecoregions in detail (see Annex 8.4 for supplementary information).

From a specific World Heritage perspective, it is significant that no property has been inscribed in the Indo-Burma biodiversity hotspot despite considerable overlap with HKH. The partial exception is TPR in Yunnan, China, which extends into the hotspot in its southernmost reaches. The Mountains of Central Asia biodiversity hotspot is also not covered by a World Heritage property in the area overlapping with HKH. However, it is important to recall that the Mountains of Central Asia only marginally overlap with HKH.

### 5.3.2 Conservation assessment of the terrestrial ecoregions (Indo-Pacific)

Wikramanayake et al. (2002) assessed the conservation status of terrestrial ecoregions of the Indo-Pacific. While the Indo-Pacific is of course a much larger region, it includes most of the HKH. As defined by the authors, the terrestrial ecoregions of the Indo-Pacific overlap with the HKH in the northern parts of two bioregions, the Indian subcontinent and the Indochina bioregion. Even though the situation analysis was conducted some 18

years ago, often based on even earlier data, the findings are still highly relevant in bringing together conservation value and urgency. It is thinkable, and indeed likely, that the situation has since changed considerably in some areas. For example, quite a few new protected areas have been created since publication. At the same time, the pressure on ecosystems, in particular forests, has sharply increased in parts of HKH. Similarly, road and hydropower development has intensified, reaching previously remote areas. The publication is strongly recommended as a most valuable source of information beyond what can be summarised for this assessment. Key findings deemed directly relevant for this assessment are briefly presented below.

One major classification criterion used by the authors was biological distinctiveness. The authors refer to the ecoregions of highest biodiversity value as ‘globally outstanding’. For obvious reasons, any ecoregion classified as globally outstanding deserves a second look from a World Heritage perspective. All 11 ‘globally outstanding’ ecoregions fully or partially overlapping with HKH are therefore listed in the subsequent table, which also includes bioregion, biome type and conservation status.

The authors argue that two out of five *priority classes* suggested are of particular importance. These two classes and relevant ecoregions within HKH are introduced below. In the terminology of the authors, Class I ecoregions are defined here as being “*globally outstanding for biological distinctiveness*”, while at the same time ‘critical’ or ‘endangered’ in terms of



conservation status. The authors refer to this subset as the “*ecoregions needing the most urgent attention*”. There is one Class I ecoregion in HKH meeting this definition, the **Terai-Duar Savanna and Grasslands**.

Famous for assemblages of rare and charismatic large mammals, such as the two largest Asian herbivores (Asian elephant, greater one-horned rhinoceros) and Asia’s largest predator, the tiger, the Terai-Duar Savanna and Grasslands are also home to two endangered endemic mammals (the hispid hare, *Caprolagus hispidus*, and the pygmy hog, *Sus salvanius* according to the authors, more commonly referred to today as *Porcula salvania*). The highly productive landscape is densely populated and intensively used for agriculture. As a result, the remaining natural habitats of the ecoregion are highly fragmented and relatively small. When formally under protection, protected areas tend to be isolated. Despite an overall bleak assessment based on the rapid conversion of the ecoregion over many decades, the authors also note encouraging restoration and community forestry efforts halting and even reversing a longstanding trend of degradation in some areas. Chitwan National Park, one of the two natural World Heritage properties in Nepal, is one of the major remaining blocks of natural habitat in the ecoregion. The overall conservation status of the region suggests that restoration and maintaining and re-establishing connectivity are likely to be the most promising conservation actions in addition to the effective management of existing protected areas.

Class III ecoregions, defined as “*globally outstanding for biological distinctiveness*”, while at the same time “*relatively intact and stable*” in terms of habitat and conservation status, were suggested as high priority ecoregions by the authors. While the urgency is not comparable to Class I, the opportunities are considered more promising, which is why the authors refer to “foresighted” conservation in this context. There are four ecoregions within HKH meeting this definition:

- **Eastern Himalaya Broadleaf Forests:** globally outstanding for endemism and richness, large intact habitat blocks of these temperate broadleaf forests remain in northeastern India and Bhutan along the mid-hills of the Eastern Himalaya. World Heritage overlap includes the inscribed property **Manas Wildlife Sanctuary** and its neighbour on the TL of Bhutan, **Royal Manas National Park**. Furthermore, **Jigme Dorji National Park** (TL of Bhutan) and **Namdapha National Park** (TL of India) are situated within the ecoregion.
- **Eastern Himalayan Alpine Shrub and Meadows:** Extending from eastern Nepal to northern Myanmar, the ecoregion boasts one of the world’s richest alpine floras with high levels of endemism. The scrub vegetation is often dominated by numerous *Rhododendron* species. Snow leopard, wolf and Asiatic black bear are among the large and charismatic mammals, as are their ungulate prey species, blue sheep, takin and red goral. Bhutan has large protected areas overlapping with the ecoregion, including **Jigme Dorji** and **Sakteng Wildlife Sanctuary**, both inscribed on the TL of Bhutan. Nepal likewise has declared important protected areas in the ecoregion, including parts of the **Sagarmatha** World Heritage property, whereas

formal protection efforts are described as less prominent in northern Myanmar at the time of writing.

- **Northern Triangle Subtropical Forests:** Located in a remote and rugged forest landscape, the forests are characterised by an unusual combination of a high degree of intactness versus a low coverage by protected areas. The high number of mammal species includes six endemics.
- **Northern Triangle Temperate Forests:** Ecoregion in the extreme northern area of the so-called Golden Triangle. While the forests are scientifically poorly known, the available information is sufficient to confirm exceptional biodiversity importance. A still largely intact forest presenting a rare large-scale conservation opportunity, while also attracting strong interest from logging companies and extractive industries.

Another global priority are the **Kayah-Karen montane rain forests:** Globally outstanding for species richness, including an exceptionally high number of mammal species. The ecoregion, as defined by the authors, is mostly located in Thailand, therefore partially outside HKH, as far as can be judged from the available maps. However, there is some overlap with the HKH in Myanmar in the Hkakaborazi area next to the Three Parallel Rivers serial World Heritage property in China.

### 5.4 National level priority-setting in the region

Most countries have been engaging in more or less systematic national conservation priority-setting over decades, often under the umbrella of the Convention on Biological Diversity (CBD). The identification and review of such information by country is beyond the scope of this regional assessment, also because of the need to distinguish between the national territory and the territory within HKH in six out of eight countries. It is clear, however, that the analysis of national level information is crucial when it comes to establishing or revising Tentative Lists or when considering extensions of existing World Heritage properties or new nominations. As noted, national priority-setting in Bhutan and Nepal can simultaneously directly serve to identify gaps in the HKH as both countries are entirely within the region according to the ICIMOD definition. The increasing efforts to engage in national exercises to identify Key Biodiversity Areas deserve to be noted due to their obvious and direct relevance for priority-setting according to World Heritage criteria (ix) and (x). KBA efforts, ongoing for example in Bhutan and Myanmar, should be fully considered in World Heritage initiatives, where available.

One concrete example of a priority suggested as a national priority was presented at the international workshop in Kathmandu: Shey Phoksundo National Park and Upper Dolpo in Nepal, for which there is strong local interest in working towards a mixed World Heritage nomination. One particularity of the large and remote protected area is the absence of roads or any other major infrastructure and the stated desire of local leaders and communities to prevent mass tourism development. In direct communication, community representatives argued that mass tourism and road access has transformed comparable valleys in the Himalaya of Nepal in ways they explicitly wish to prevent.

## 5.5 Existing transboundary priorities and efforts

The above review of priority-setting exercises leaves no doubt that border areas in the HKH are of particular conservation interest. At the same time, borders are politically sensitive and often particularly sensitive in the HKH. Many of the border areas of the HKH are remote and in several ways marginalised, which partly explains the systematic overlap with high conservation values. As in other mountain ranges shared by several countries elsewhere, significant conservation values not only overlap with border areas, but also with high ethnic and cultural diversity.

ICIMOD has adopted a landscape (ecosystem) approach in line with the CBD. As political borders typically do not coincide with natural landscape borders, it is clear that the approach entails the full consideration of transboundary approaches. ICIMOD has developed a transboundary landscape approach to promote the conservation and sustainable use of natural resources at the scale of larger landscapes defined by ecosystems, explicitly across national borders. For this purpose, six transboundary landscapes were identified in the HKH region, four of which have so far evolved into operational initiatives, as listed below; transboundary landscapes with operational initiatives are highlighted in bold, the name of the corresponding initiative is provided in brackets when applicable. Please note that another initiative under ICIMOD's overarching transboundary landscapes scheme is dedicated to REDD+. It is mentioned for the sake of completeness but otherwise outside of the scope of this assessment.

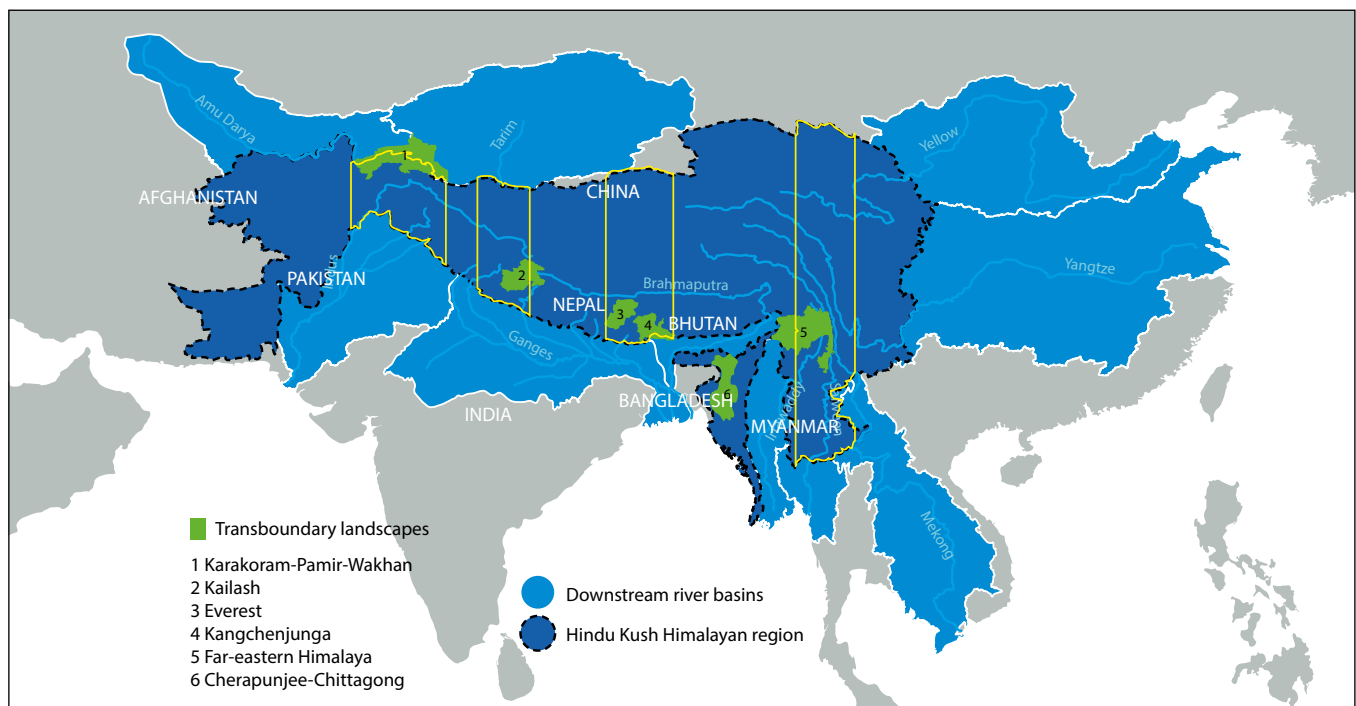
- **Kangchenjunga Landscape** (Kangchenjunga Landscape Conservation and Development Initiative, KLCDI).
- **Landscape Initiative for Far-Eastern Himalayas** (HI-LIFE, formerly Brahmaputra-Salween Landscape Conservation and Development Initiative, BSLCDI).

- **Kailash Sacred Landscape** (Kailash Sacred Landscape Conservation and Development Initiative, KSLCDI).
- **Hindu Kush Karakoram Pamir Landscape** (Hindu Kush Karakoram Pamir Landscape Initiative, HKPLI).
- Everest.
- Cherrapunjee-Chittagong Landscape.

The four operational transboundary landscapes are highly relevant for any large-scale conservation initiative in the HKH due to their scale and overlap with recognised conservation priorities, explicit governmental commitment and the intergovernmental framework provided by ICIMOD. The four transboundary landscapes with operational initiatives are briefly described hereafter based on ICIMOD data in the public domain and inputs from selected ICIMOD staff on the occasion of the international workshop.

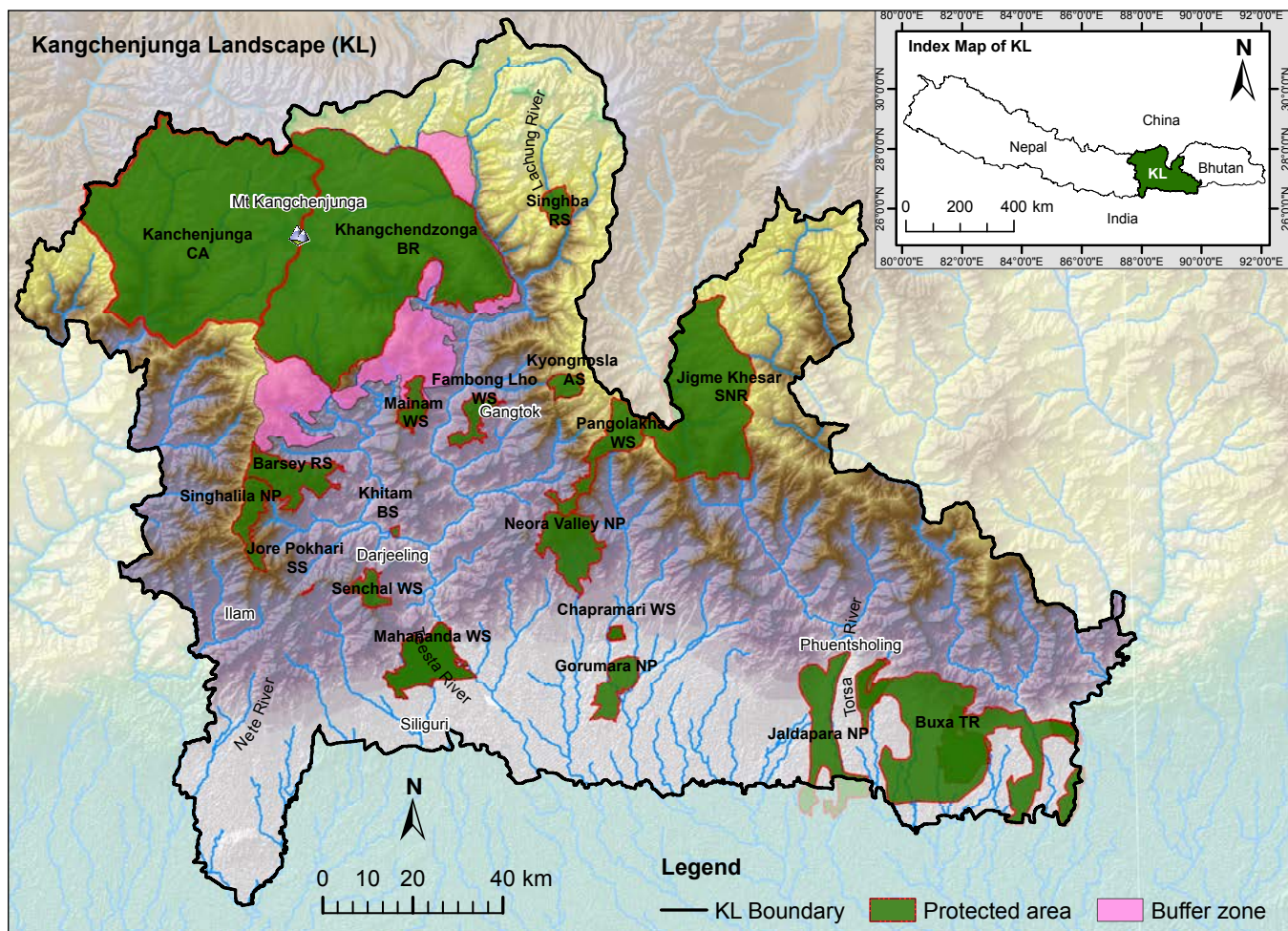
### **Kangchenjunga Landscape Conservation and Development Initiative (KLCDI)**

This landscape focuses on the southern side of the Kangchenjunga Massif, peaking in the world's third highest mountain at 8,586 m a.s.l. The landscape descends into the Terai-Duar lowlands down to only 40 m a.s.l. The peak itself is shared by India and Nepal. The Kangchenjunga Landscape (KL), as defined by ICIMOD, covers some 2.5 million ha and spreads across part of eastern Nepal, Sikkim and West Bengal of India, as well as the western and southwestern parts of Bhutan. While China is neighbouring to the north, it is not formally part of this initiative. The landscape is the origin of several of the Himalaya's major rivers and crucial watersheds, a major ecosystem service to millions of downstream residents. Almost half the landscape is comprised of a large variety of markedly distinct forest types up to an unusually high timberline. Mount Kangchenjunga and its landscape, and



**Map 8: Transboundary Landscapes facilitated and promoted by ICIMOD.** The overall disclaimer stated at the beginning of this assessment applies. Source: ICIMOD.





**Map 9: Kangchenjunga Landscape (KL) and protected areas therein.** Note that buffer zones are visualised where applicable. The overall disclaimer stated at the beginning of this assessment applies. Source: ICIMOD.

many features therein, are sacred to indigenous peoples and local communities and several major belief systems, including beyond the landscape itself.

The entire KL is within the Himalaya biodiversity hotspot with almost one third of it formally protected in 19 protected areas, comprising 30% of the landscape. This is visualised in the subsequent map.

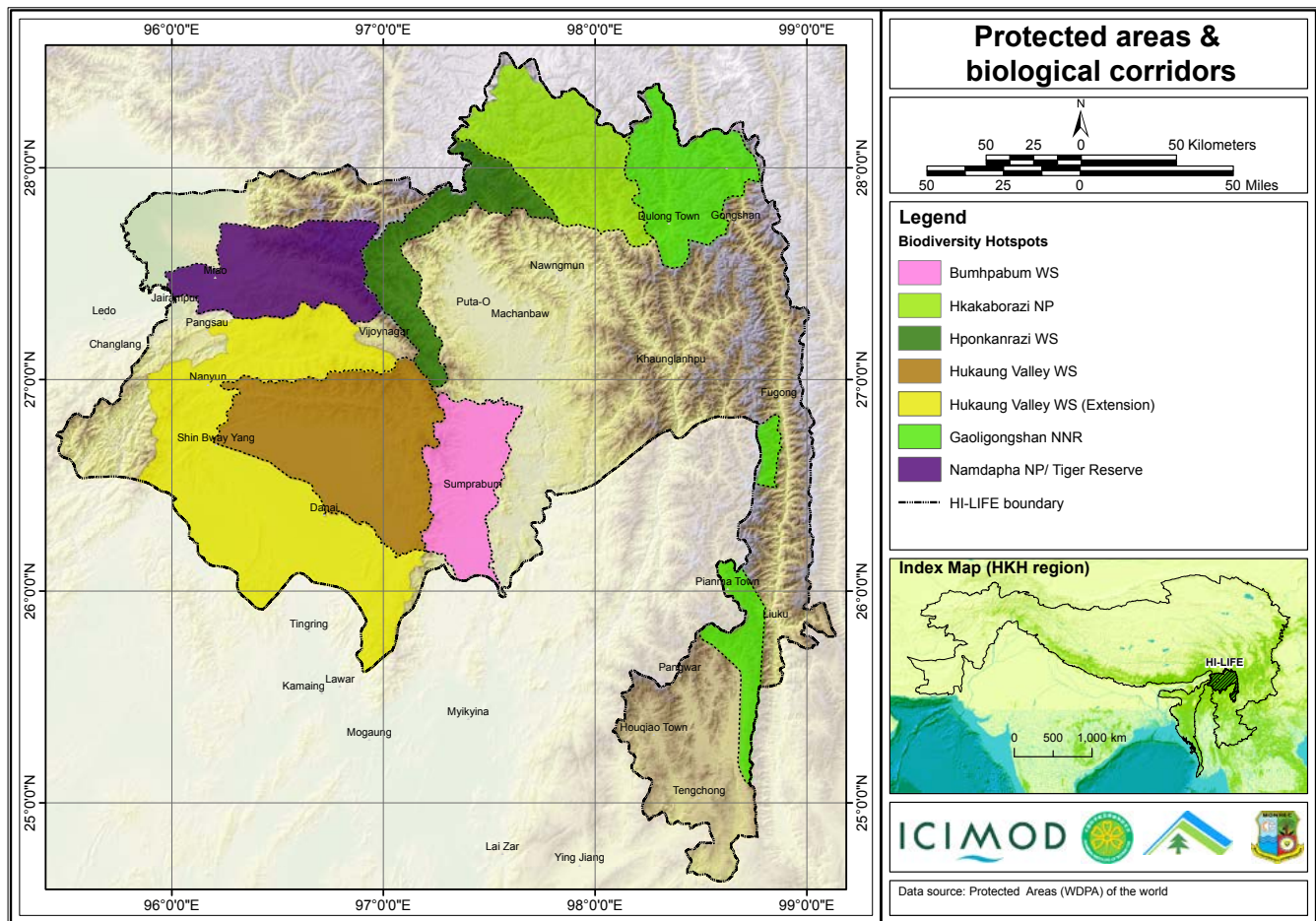
The most conspicuous protected areas within the landscape are two large and contiguous protected areas around Mount Kangchenjunga in the northwest of the transboundary landscape: Khangchendzonga National Park in Sikkim, India, which was inscribed in 2016 as a mixed World Heritage site for its extraordinary cultural and natural values and the Kangchenjunga Conservation Area in Nepal. The landscape also encompasses Neora Valley National Park on India's TL since 2009, which is connected to Bhutan's Jigme Khesar Strict Nature Reserve. Several of the smaller protected areas are recognised as priorities by CEPF (2005) in its ecosystem profile of the eastern part of this hotspot. It would be a very worthwhile World Heritage investment to thoroughly analyse the potential for contiguous and/or serial extensions of the existing property Khangchendzonga National Park within Sikkim and/or across the borders shared with Bhutan and Nepal.

#### **Landscape Initiative for Far-Eastern Himalayas (HI-LIFE)**

The Landscape Initiative for Far Eastern Himalayas (HI-LIFE – formerly Brahmaputra-Salween Landscape Conservation and Development Initiative – BSLCDI) covers some seven million ha of land in southwestern China, northeastern India and northern Myanmar between the mighty Brahmaputra (Yarlung Tsangpo) and Salween (Nujiang, Thanlwin) rivers. The aim is collaboration among local, national and regional stakeholders to improve the management of a globally significant landscape at the meeting point of three biodiversity hotspots. It is also the meeting point of the Eastern Himalaya and the western Hengduan Mountains. Poverty, tourism, hydropower and infrastructure developments are among the complex issues to be considered.

The landscape contains many protected areas, and probably protected area gaps, of global importance. From a World Heritage perspective, the Three Parallel Rivers of Yunnan Protected Areas (China) stand out as the most striking overlap between the Convention and the ICIMOD approach. Several sites on the TL indicate further overlap and potential, namely Namdapha National Park (India, includes Kamlang Wildlife Sanctuary and Jairampur Forest Division) and the Hkakabo Razi Landscape (Myanmar). The latter is also known as the Northern Mountain Forest Complex (NMFC) and comprises the Hkakabo Razi National Park and its proposed southern extension, as well as Hponkan Razi Wildlife Sanctuary.





**Map 10: HI-LIFE, the Landscape Initiative for the Far Eastern Himalayas. Location, area and key protected areas and biological corridors. The overall disclaimer stated at the beginning of this assessment applies. Source: ICIMOD.**

### Kailash Sacred Landscape (KSLCDI)

Kailash Sacred Landscape Conservation and Development Initiative (KSLCDI) is being implemented across the borders of China, India and Nepal and involves various local and national research and development institutions working in different capacities in various regions of the three countries. KSLCDI aims to achieve long-term conservation of ecosystems, habitats and biodiversity, while encouraging sustainable development, enhancing the resilience of communities in the landscape, and safeguarding cultural linkages among local populations.

Covering an area of more than 3 million ha, the landscape includes the remote, southwestern portion of China's Tibet Autonomous Region (TAR), adjacent districts in Nepal's far western region, and the north eastern flank of the state of Uttarakhand in India. KSLCDI encompasses an impressive altitudinal gradient of only 390 m a.s.l. all the way to almost 7,700 m a.s.l. The sacred landscape includes, or is in the close vicinity of, several major protected areas in all three involved countries, including Nanda Devi Biosphere Reserve in India. The two core zones of the biosphere reserve jointly constitute the serial World Heritage property Nanda Devi and Valley of Flowers National Parks. Map 11 below visualises the transboundary landscape.

### Hindu Kush Karakoram Pamir Landscape (HKPL)

ICIMOD describes the Hindu Kush Karakoram Pamir Landscape as the landscape of the Karakoram, Pamir Mountains and the

Wakhan along the China-Pakistan-Afghanistan and Tajikistan border areas representing "a highly fragile alpine ecosystem with unique biodiversity that is currently under threat from increasing anthropogenic pressure and drivers of global change". As noted earlier, Tajikistan explicitly forms part of HKPL even though it is not an ICIMOD member state. Overall, the Hindu Kush Karakoram Pamir Landscape Initiative (HKPL) covers more than 6.7 million ha of mostly arid and semi-arid land, including cold winter deserts. HKPL seeks the support and collaboration of involved international development agencies, local organisations and community members to formulate a long-term conservation and development plan. The participation of a wide range of stakeholders, including local agro-pastoral communities, is considered essential to balance the conservation and the needs of communities reliant on the area's natural resources.

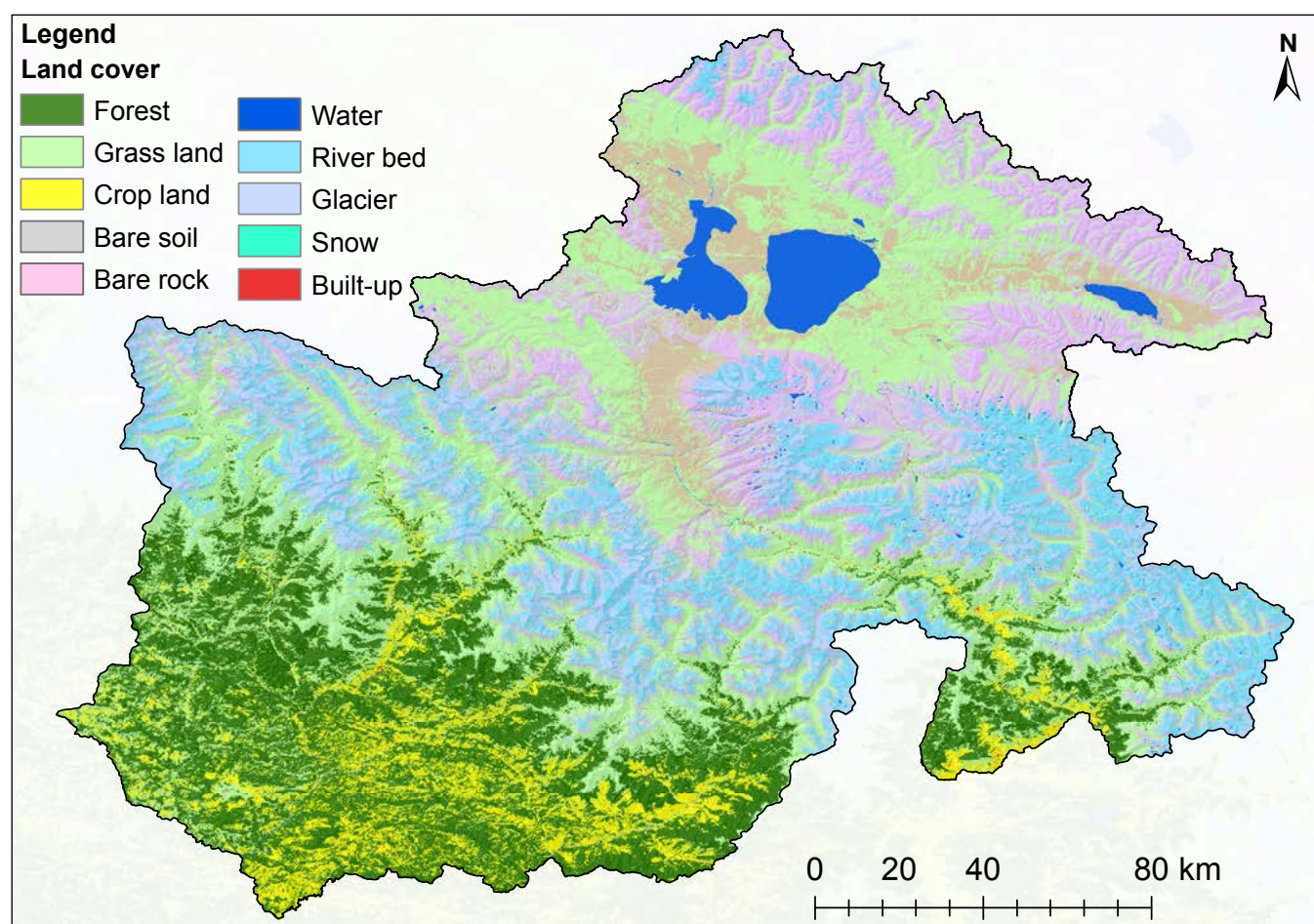
Part of the ancient Silk Road, the landscape is today part of the Belt and Road Initiative (BRI) and the China Pakistan Economic Corridor (CPEC). This is inevitably inducing change and adding political complexity.

Six physically connected protected areas jointly form a conservation complex of a stunning 3.3 million hectares: Wakhan National Park (Afghanistan), Taxkorgan Nature Reserve (China), Broghil National Park, Qurumbur National Park, Khunjerab National Park (all located in Pakistan) and Zorkul Nature Reserve (Tajikistan). The latter is on the Tentative List of Tajikistan.

**Table 8:** An overview of the Kailash Sacred Landscape. KSL includes several national protected areas (see Table), enhanced regional cooperation is crucial to ensure the long-term sustainable development and conservation of this important landscape and its communities. Source: ICIMOD.

## Geological attributes of the Kailash Sacred Landscape

Landscape/ part of landscape	Total area (km <sup>2</sup> )	Elevation range (masl)	Number and area of watersheds (km <sup>2</sup> )	Protected area in or ad- jacent to the KSL	Ecologically and/or cul- turally signifi- cant lakes	Forest area (km <sup>2</sup> )	Range- lands (% of total land area)	Human popula- tion
Entire landscape	31,252	390–7,694	14 total	–	-	8,489	27%	1,032,800
In China	10,843	3,641–7,694	2 total: Karnali – 3,062 Manasarovar – 7,781	Manasarovar Wetland Complex Changthang Nature Reserve	Lake Manasarvar Lake Rakshastal	<5	49%	8,800
In India	7,120	428–6,895	4 total: Panar-Sarya – 350 Saryu-Ramganga – 1,500 Gori – 2,750 Dhaulī-Kali – 2,650	Nanda Devi Biosphere Reserve Askot Wildlife Sanctuary	Parvati Tal Anchheri Tal Chhipla Kund	4,965	13%	460,000
In Nepal	13,289	390–7,336	–	Khaptad National Park Api-Nampa Conservation Area	Chhungsa Daha Chhyungar Daha Khapad Daha	3,524	18%	564,000



**Map 11:** Land use and land cover in the Kailash Sacred Landscape. The overall disclaimer stated at the beginning of this assessment applies. Source: ICIMOD.



**Table 9:** A basic overview of the emerging Bam-e-Dunya Network. The table lists all major protected areas in the four countries jointly engaged in the Hindu Kush Karakoram Pamir Landscape (HKPL). Source: ICIMOD.

Protected area	Country	Area coverage (km <sup>2</sup> )	Elevation range (masl)	Established Year	IUCN category	District/ province
Wakhan National Park	Afghanistan	10,878	n/a	2014	-	Wakhan
Khunjerab National Park	Pakistan	4,455	3,300–7,700	1975	II	Gojal Tehsil, Hunza-Nagar
Broghil National Park	Pakistan	1,348	3,217–5,696	2010	-	Chitral
Qurumbar National Park	Pakistan	740	2,474–5,914	2011	-	Ghizer
Taxkorgan Nature Reserve	China	15,000	3,000–8,000	1984	IV	Xinjiang Uygur
Autonomous Region Zorkul Strict Nature Reserve	Tajikistan	1,610	4,000–5,460	2000	I	Gorno-Badakhshan

Note: Not all protected areas in the region are listed above



**Map 12:** The Hindu Kush Karakoram Pamir Landscape and the six contiguous protected areas within it. The overall disclaimer stated at the beginning of this assessment applies. Additional disclaimer: Tajikistan is not an ICIMOD member country. Nonetheless, Tajikistan is important when looking at the landscape in a holistic fashion. Source: ICIMOD.



**Table 10: Results of a SWOT analysis for the World Heritage potential in ICIMOD Transboundary Landscapes.** Conducted at an expert workshop at ICIMOD headquarters. Source: ICIMOD, 2019a. Minor corrections and adaptations by the author.

Strengths	Weaknesses	Opportunities	Threats
<b>Hindu-Kush Karakoram Pamir Landscape (HKPL)</b>			
<ul style="list-style-type: none"> <li>■ Unique natural and cultural heritage</li> <li>■ Rich tradition and culture</li> <li>■ Silk/Spice Road connectivity</li> <li>■ Existing transboundary protected areas</li> <li>■ Numerous nationally recognised protected areas</li> <li>■ Experience in heritage nomination</li> <li>■ Strong bilateral relationships (signed treaties)</li> <li>■ Bam-e-Dunya network</li> <li>■ Local community involvement</li> </ul>	<ul style="list-style-type: none"> <li>■ Lack of collective thinking</li> <li>■ Lack of awareness on transboundary issues (e.g. wildlife trade, human–wildlife conflict)</li> <li>■ Way forward is not clear</li> <li>■ Lack of stakeholder dialogue</li> </ul>	<ul style="list-style-type: none"> <li>■ Regional government to strengthen the capacity of local institutions</li> <li>■ Research investment on heritage sites and their networking</li> <li>■ Branding as roof of the world (Bam-e-Dunya)</li> <li>■ Potential sites for World Heritage nomination</li> <li>■ Major tourism potential</li> </ul>	<ul style="list-style-type: none"> <li>■ Ambitious infrastructure initiatives, such as BRI, threatening the pristine environment / landscape</li> <li>■ Rapid urbanisation and in-migration</li> <li>■ Susceptibility to natural disasters and climate change</li> <li>■ Threat to local culture</li> </ul>
<b>Kailash Sacred Landscape (KSL)</b>			
<ul style="list-style-type: none"> <li>■ Very high biological and cultural values</li> <li>■ Solid research-based documentation</li> <li>■ Famous Kailash pilgrimage routes – ancient/historic and heritage</li> <li>■ KSL on Tentative List of India (subsequently removed again)</li> <li>■ China designated international tourism cooperation zone (China –Nepal)</li> </ul>	<ul style="list-style-type: none"> <li>■ Limited boundary delineation</li> <li>■ Limited awareness and understanding of World Heritage expectations, requirements and procedures</li> <li>■ Limited economic opportunities</li> <li>■ Disconnect between tangible and intangible domain (belief systems, traditions)</li> </ul>	<ul style="list-style-type: none"> <li>■ Striking potential</li> <li>■ Sacred in all three countries</li> <li>■ Peace park</li> <li>■ Promotion of spiritual tourism</li> <li>■ Boundary delineation to expand spiritual linkages (Noosphere)</li> <li>■ Managing spiritual space of Kailash</li> <li>■ Increased economic opportunities from tourism</li> <li>■ BRI (also noted as a possible threat)</li> </ul>	<ul style="list-style-type: none"> <li>■ Sensitive geo-politics affecting traditional practices</li> <li>■ Changes arising from new market forces</li> <li>■ Increased infrastructure (including from BRI, noted as a potential opportunity also) affecting cultural integrity and spiritual domain</li> <li>■ Erosion of traditional knowledge and management</li> <li>■ Socio-economic and demographic changes, e.g. out-migration</li> <li>■ Natural and anthropogenic climate change and hazards, such as landslides</li> <li>■ Excessive <i>Yarsa Gumbu</i> caterpillar fungus extraction</li> </ul>
<b>Kangchenjunga Landscape (KL)</b>			
<ul style="list-style-type: none"> <li>■ Enabling factors, such as politically endorsed landscape programmes</li> <li>■ Existing protected areas and corridors Including CCAs</li> <li>■ Similar belief systems</li> <li>■ Indigenous knowledge systems</li> <li>■ Transboundary ecosystem services</li> <li>■ Rich biodiversity and natural resources</li> </ul>	<ul style="list-style-type: none"> <li>■ Border area restrictions</li> <li>■ Physical accessibility</li> <li>■ Changing cultural heritages sites</li> <li>■ Over-exploitation of natural resources</li> <li>■ Lack of long-term data</li> </ul>	<ul style="list-style-type: none"> <li>■ Eco-tourism</li> <li>■ Yak culture</li> <li>■ Mitigation of human–wildlife conflict</li> <li>■ Economic benefits</li> <li>■ Transboundary research</li> </ul>	<ul style="list-style-type: none"> <li>■ Development including land use change</li> <li>■ Geo-sensitivity</li> <li>■ Unregulated tourism</li> <li>■ Climate change and associated sensitivity</li> </ul>

Strengths	Weaknesses	Opportunities	Threats
<b>Landscape Initiative for Far Eastern Himalayas (HI-LIFE)</b>			
<ul style="list-style-type: none"> <li>■ Strong political commitments to and within HI-LIFE</li> <li>■ Ecosystem connectivity (high endemism, rich biodiversity)</li> <li>■ A connected and vast landscape with high probability of World Heritage potential as indicated by the existing Three Parallel Rivers property in China</li> </ul>	<ul style="list-style-type: none"> <li>■ Political consensus at transboundary level takes a long time</li> <li>■ Poor legislation</li> <li>■ Insufficient scientific research (data deficiency)</li> <li>■ Policy coordination among the countries is poor</li> <li>■ Limited understanding and awareness of the Convention among the countries</li> </ul>	<ul style="list-style-type: none"> <li>■ Tourism, joint research</li> <li>■ Increased governmental recognition of the importance of CBD and research</li> <li>■ Similar culture and traditions</li> <li>■ Possibility of common trade, e.g. of medicinal plants like <i>Paris polyphylla</i>)</li> </ul>	<ul style="list-style-type: none"> <li>■ Conflicting interests among government and communities</li> <li>■ Insufficient management and planning</li> <li>■ Inadequate tourism</li> <li>■ Unsustainable natural resources use (wildlife and key high value trade)</li> <li>■ Poverty</li> <li>■ Climate change</li> </ul>

This spectacular network of protected areas is subject to specific attention under the umbrella of ICIMOD and referred to as the Bam-e-Dunya Network, which “shall work towards connecting landscapes along the Silk Route”. The public proceedings of a workshop dedicated exclusively to this protected area complex are a valuable source for interested readers (ICIMOD, 2019b). For example, reference was made in discussions to the possible cultural and natural World Heritage potential of the landscape. The built heritage of the landscape was described as both extraordinarily rich and in need of attention. Renovation efforts described as exemplary on the forts of Baltit, Altit Fort, Shigar and Kapolo, according to workshop participants, should be extended to additional sites.

Synthesising the section, it becomes clear that all four of ICIMOD's operational landscape initiatives offer rare politically endorsed platforms and frameworks for structured dialogue about nature conservation challenges and opportunities in large and complex landscapes shared across international borders. In every single one of the landscapes, protected areas can be regarded as networks or systems comprising multiple areas, embedded within much larger landscapes. All four landscapes, and the protected area systems within them, are undoubtedly of global conservation significance. The intergovernmental endorsement of a structured dialogue across national borders is encouraging and potentially relevant from a World Heritage perspective as well.

Existing World Heritage properties in two of the four landscapes, namely, Khangchendzonga National Park in the Kangchenjunga Landscape and Three Parallel Rivers of Yunnan Protected Areas in HI-LIFE can potentially serve as seeds or anchors for more ambitious World Heritage approaches comprised of multiple protected areas. In addition, it should be kept in mind that Sagarmatha World Heritage site is located in ICIMOD's Everest Transboundary Landscape. While not operational for the time being, an eventual future operationalisation would be of interest from a World Heritage perspective as well.

The same holds true for sites on the Tentative Lists overlapping with the ICIMOD Transboundary Landscapes. On the occasion of the international workshop in Kathmandu, initial brainstorming exercises were facilitated at the working level to collect food for

thought in terms of the World Heritage potential. The group work was structured as a SWOT analysis and revealed the considerations summarised below in Table 10. Put simply, there is widespread recognition of ongoing development trajectories at odds with nature conservation, particularly as regards HI-LIFE and HKPL. Many participants argued that innovative and ambitious conservation efforts can and should be integral parts of these ICIMOD initiatives.

# Conclusions and recommendations

## 6



A free-flowing mountain torrent in Sikkim, India. ©IUCN / Tilman Jaeger.



## 6.1 General conclusions and recommendations

Strongly supported by the rich discussions on the occasion of the international workshop in Kathmandu, this assessment was able to reaffirm and document that the Hindu Kush Himalaya stands out globally for its exceptional natural and cultural wealth and diversity. The cultural and natural attributes, values, benefits and services of the contiguous and intricately linked mountain ranges of the region are extraordinary by any standard; the HKH region is a vastly magnified version of the beauty and economic, ecological and cultural significance of the world's large mountain ecosystems. While several globally significant and indeed stunning places have been inscribed on the World Heritage List over the last decades, the use of the World Heritage Convention as a conservation instrument clearly remains underutilised in the region.

Another important reality confirmed by this assessment is the region's extraordinary heterogeneity. From a nature conservation perspective, this is reflected in an enormously wide range of settings: large and intact landscapes with an exceptional degree of naturalness coexist next to highly fragmented, overused and degraded landscapes under enormous and acute threat. Broadly speaking, HKH's exceptional conservation values coincide with exceptional threats and challenges, both in terms of culture and nature.

Even though there are still important protected area gaps in the region, long-term trends indicate that the expansion of the regional protected area estate peaked many years ago. This suggests a transition into a phase of highly needed consolidation rather than continued expansion. Most scholars and practitioners have come to the conclusion that the future of conservation in the region will have to go beyond protected areas. While effectively and equitably managed protected areas will continue to be indispensable cornerstones of conservation, the focus is shifting from individual protected areas to protected area networks. Equally important, natural resource management respecting the vulnerability of the surrounding and much larger landscapes without formal protection status is needed, fully involving stakeholders and rights-holders who are integral parts of these landscapes. World Heritage efforts must fully consider these trends, if they are to contribute to a meaningful and structured response to the regional conservation challenges.

The following general conclusions and recommendations follow the structure of the previous chapters.

### Towards a new World Heritage vision for the HKH region

The analysis of existing World Heritage properties confirmed that several of the world's most spectacular protected areas have duly been recognised under the Convention in the region. It is perhaps less expected that more than half of the countries in the region have no properties on the World Heritage List inscribed under natural World Heritage criteria within HKH (Afghanistan, Bhutan, Myanmar, Pakistan, with Bhutan having no property on the World Heritage List at all).

Many of the earlier inscriptions are relatively small national parks without buffer zones formally recognised under the Convention. While acknowledging a lack of consensus, protected areas theory and practice have been subject to an ongoing re-orientation from individual protected areas managed and owned by national governments towards (i) a broader array of management categories and governance set-ups; (ii) the inclusion of a wider range of stakeholders and rights-holders; (iii) networks or systems of protected areas; and (iv) the integration of protected areas into the wider landscape. Generally speaking, there is little evidence that such conceptual changes are reflected in national World Heritage strategies, let alone a coherent regional approach. At the same time, there are indications of a number of encouraging trends.

The emergence of complex, large-scale and innovative interpretations of World Heritage nominations is a remarkable and strongly encouraging response to intensifying pressure and evolving conservation thinking. This emergence is also remarkably consistent with the call for a wilderness and large landscapes approach under the World Heritage Convention (see Box 2). Put simply, a vision for World Heritage as a contributor to meaningful conservation initiatives in the region will have to be based on more ambitious conservation approaches under the umbrella of the Convention, including large-scale conservation complexes, serial properties and mixed approaches bringing together nature and culture. To put this vision into practice and to systemically promote a regional interpretation of the Convention in line with the regional challenges and the evolution of conservation thinking, the following elements are proposed as food for thought and inspiration.

Successful recent nominations from the region fundamentally differ from the 'first generation' of inscriptions in the region dating back to 1979. Rather than adding a World Heritage label to national parks, recent inscriptions have been based on innovative and ambitious conservation efforts. These include one of the world's largest terrestrial natural World Heritage properties; the first ever mixed property in the region; a very large serial property comprised of multiple components; and a conservation complex comprised of several contiguous protected areas. The emergence of increasingly ambitious interpretations of the Convention is also reflected in Tentative Lists of several States Parties in the region, which now include:

- ➔ Large-scale nomination approaches;
- ➔ Complex serial approaches;
- ➔ Mixed approaches attempting to integrate natural and cultural heritage conservation and management; and
- ➔ A highly interesting river corridor proposed by Myanmar, unprecedented in the region and possibly worldwide that deserves to be noted despite location outside the HKH.

**Box 3: Towards a new World Heritage vision for the HKH region.** Source: Author.

### Re-visiting 'first generation' World Heritage

Roughly half of the natural World Heritage properties in the HKH region were inscribed within the first decade of the existence of the World Heritage List, some two-thirds were inscribed by 1992. This is not to call these magnificent sites into question, all of which are extraordinary representations of the HKH. It is clear, however, that this 'first generation' of World Heritage inscriptions cannot serve as a model today, both due to the increasing challenges in the region and because conservation thinking has grown from its earlier focus on individual protected areas taken out of their landscape context. Given major and ongoing changes in the surrounding landscapes, it is clear that such approaches are far from a best case scenario.

Even a superficial look reveals that much has changed in and around several of the national parks inscribed in the early days of the Convention. In most cases, a wealth of information has been generated since inscription, and zonation, governance, community engagement, legal and policy frameworks have typically been evolving, as has the pressure on natural resources in most cases. The reality of these properties in some cases has grown out of the framework used to justify World Heritage inscription at the time. In quite a few cases, many new protected areas have been created post-inscription, in several cases directly adjacent to or in the vicinity of existing World Heritage properties. While on the margin of HKH as defined by ICIMOD, the Manas Wildlife Sanctuary epitomises this observation, as it is inscribed according to a name and spatial configuration that has long given way to a much more ambitious approach.

World Heritage properties do not have to be – and should not be – considered as static entities. There is no technical reason why existing World Heritage properties should not be systematically re-visited to analyse options to consolidate conservation. A 'new generation' of natural World Heritage in the region is not just about potential new properties, but could encompass more effective configuration of existing World Heritage properties.

This assessment confirmed that most of the early World Heritage inscriptions are located within recognised global conservation priority areas. At the time of inscription, they were often the best or even only representation of the given priority area. Today, several of the existing properties are embedded in landscapes, which routinely boast multiple contiguous or nearby protected areas of global importance created post-inscription. Consequently, such properties would benefit from structured analysis in terms of the potential for contiguous or serial extensions.

#### Recommendation 1

**Systematically re-visit existing World Heritage properties in order to analyse options to consolidate and expand them through contiguous and/or serial extensions.**

### Crossing borders

A conspicuously high number of World Heritage properties and 'candidate sites' on the Tentative Lists in the region are located along or near international and/or sub-national borders. The existing properties featuring a transboundary dimension emerged as both a particularly relevant and particularly sensitive subset

in the assessment. There is also a conspicuous spatial overlap between border regions and areas of highest conservation interest beyond the existing properties.

The existing properties in the HKH region include the world's highest and third highest peaks, respectively. Both peaks are shared by two countries, thereby epitomising shared transboundary ecosystems. Further examples include Manas Wildlife Sanctuary in India. Numerous priority-settings reviewed for this assessment have confirmed the global importance of the adjacent Royal Manas National Park, on the TL of Bhutan. From a technical perspective, it is clear that the two protected areas ecologically belong together and ideally should be managed accordingly in coherent and coordinated fashion, including under the Convention if desired by the States Parties. In terms of sub-national borders, it is conspicuous that three properties in China, for example, are restricted to single provinces when the ecosystems extend across sub-national borders. From a technical perspective, the potential for contiguous and serial extensions across sub-national borders is as applicable nationally as it is internationally across national borders.

#### Recommendation 2

**When re-visiting existing World Heritage properties, specifically consider options to engage in contiguous or serial extensions across national and sub-national borders, as applicable and feasible.**

### World Heritage and the ICIMOD Transboundary Landscapes

Both the World Heritage Convention and ICIMOD are intergovernmental instruments and platforms. While the Convention has an explicit focus on the identification and conservation of cultural and natural heritage, ICIMOD has a much broader scope. However, this scope explicitly encompasses natural resource management and conservation. It is therefore helpful to consider overlaps and potential for synergy between the two intergovernmental efforts as a matter of principle.

The assessment was able to demonstrate that there are specific entry points, which would lend themselves to possible coordination and cooperation between ICIMOD and the Convention. At this point in time, there is not a single transboundary property in the HKH under one or several natural criteria despite globally striking potential from the perspective of conservation values. It can reasonably be argued that the main reasons for this fact are political. It is thus most noteworthy that ICIMOD is engaging in the promotion of several transboundary landscapes, involving at least two and typically more than two of its member states. ICIMOD has this remarkable mandate despite political sensitivities. One could even argue that ICIMOD has this mandate due to these very sensitivities.

While nature conservation is not the primary objective of the ICIMOD Transboundary Landscapes, it is an integral element of the approach taken. In every single one of the four operational transboundary landscape initiatives, there are protected area 'systems' comprising multiple areas embedded within the much larger landscape. All four landscapes, and the protected area

systems within them, are undoubtedly of global conservation significance. The structured dialogue across national borders endorsed by involved governments is encouraging and potentially highly relevant from a World Heritage perspective as well.

Protected areas in two of the four operational ICIMOD Transboundary Landscapes include two of the region's most notable World Heritage properties, Khangchendzonga National Park (Kangchenjunga Landscape) and the Three Parallel Rivers of Yunnan Protected Areas (HI-LIFE). The transboundary landscapes also encompass several 'candidate sites' on the Tentative Lists of the region. As suggested by participants of the international workshop, these properties can potentially serve as seeds or anchors for more ambitious World Heritage approaches comprised of multiple protected areas within these landscapes. There is evidence of possible World Heritage merits of several protected areas in the two remaining ICIMOD Transboundary Landscapes, as well. Thereby, there is possible World Heritage potential in all four operational ICIMOD Transboundary Landscape Initiatives, which deserves full consideration. While many such ideas probably require a longer-term vision from a political perspective, this should not prevent an open discussion at the technical level to enable informed decision-making.

### **Recommendation 3**

**Systematically analyse options to bring together World Heritage and the ICIMOD Transboundary Landscape initiatives, using existing properties and sites on the Tentative Lists as anchors and seeds for more comprehensive and ambitious conservation efforts, where applicable.**

## **6.2 Future World Heritage potential: Broad gaps and hints at potential sites**

While this assessment cannot replace in-depth analysis required for the identification of specific sites, which may or may not be of World Heritage calibre, it was able to identify broad gaps and hints at specific sites meriting further analysis. Both are presented below.

### **Broad gaps**

This systematic review of all existing World Heritage properties against priority-setting schemes and specific World Heritage studies provides clear hints at the broad gaps in the HKH region. While none per se offers any guarantee for successful World Heritage nominations, all of them deserve full consideration:

- Cold winter deserts have long been identified as a broad gap in World Heritage coverage globally. Consequently, the cold winter deserts of the HKH deserve in-depth analysis.
- The Eastern and the Western Himalayan Broadleaf and Conifer Forests, both among the Global 200, consistently emerge as broad gaps. While the recent inscription of Khangchendzonga National Park (KNP) in India has partially addressed this broad gap in the Eastern Himalaya, several studies suggest room for both serial extensions of KNP and for additional sites in the vast subregion, including in Bhutan and India's North Eastern Region. Part of the latter region includes the Meghalaya subtropical forests

ecoregion, likewise considered to be globally outstanding in an in-depth regional conservation assessment and likewise without current World Heritage coverage.

- The Eastern Himalayan Alpine Shrub and Meadows are adjacent to the above-mentioned Eastern Himalayan Broadleaf and Conifer Forests and likewise emerge as a global conservation priority without World Heritage recognition besides the recent inscription of Khangchendzonga National Park. The Eastern Himalayan forests and alpine shrubs and meadows encompass several protected areas in the Kangchenjunga Landscape promoted by ICIMOD.
- The forests of northern Myanmar overlapping with the HKH region near the unique confluence of three global biodiversity hotspots consistently stand out as a global conservation priority without World Heritage coverage. They are sometimes referred to as the Northern Triangle Subtropical Forests and the Northern Triangle Temperate Forests, respectively. Despite undoubted potential, the very high conservation values and continued large-scale intactness coincide with growing threats and pressures. It is noteworthy that the gap overlaps with the ICIMOD Landscape Initiative for Far-Eastern Himalayas (HI-LIFE).
- The massive conservation complex comprised of six large protected areas in Afghanistan, China, Pakistan and Tajikistan amounts to a joint area exceeding 3.3 million ha. The complex is the heart of ICIMOD's Hindu Kush Karakoram Pamir Landscape and likewise stands out as a possible World Heritage gap in the northwest of HKH deserving further analysis.
- Rivers are major, culturally, religiously and spiritually revered elements of the landscape in the HKH region, also serving as natural corridors. At a time of sharply increased hydropower development in the HKH, free-flowing rivers are becoming ever more rare. If any meaningful representations of untamed rivers of the world's highest mountain ranges and their biodiversity are to remain, effective conservation approaches are needed now, including under the Convention. According to feedback provided by workshop participants and additional experts consulted, similar thinking underpinned the inclusion of the Ayeyawady River Corridor on the Tentative List of Myanmar. Formally outside HKH, the proposed site has strong linkages with the HKH.

### **Recommendation 4**

**Systematically consider the identified broad gaps when engaging in revisions of Tentative Lists or natural or mixed World Heritage initiatives in the region.**

### **Regional use of World Heritage criteria: The geoheritage gap**

Quite a few properties in the region were inscribed under World Heritage criterion (vii). Several were exclusively inscribed under this criterion, which is uncommon and discouraged today due to the somewhat subjective nature of the criterion, in particular as regards landscape beauty. IUCN encourages States Parties to combine the criterion with other natural criteria. Further



successful use of criterion (vii) seems possible in the visually stunning region with its countless superlative features. Tentative List exercises and individual nomination efforts should consider the applicability of the criterion on a case-by-case basis, preferably combined with one or several other criteria.

Both criteria (ix) and (x), the ‘biodiversity criteria’, have routinely been applied in the region, at times combined. However, hardly any use has been made of criterion (viii) in the region. Sometimes referred to as the ‘geological criterion’, this criterion in fact encompasses geological, geomorphological and palaeontological values, among other dimensions. In terms of future potential, this assessment faced the challenge that very limited structured information is readily available on the region from the perspective of World Heritage criterion (viii) with the exception of hints at fossil sites of note identified in a specific thematic study listed here for the sake of completeness: Maya (Gansu) and Yangtze Gorge (both China); sites in the Siwaliks (India). The assessment could not satisfactorily contribute to the identification of entry points for World Heritage potential under this criterion. The main recommendation is thus to address the information gap.

### **Recommendation 5**

**In recognition of the paucity of structured information assessing the regional potential under World Heritage criterion (viii), consider a thematic study for the region to initiate an overdue structured regional approach to geoheritage under the Convention.**

### **Hints at sites of potential World Heritage calibre**

Information used in this assessment also provided hints at potential sites under World Heritage criteria (ix) and (x). Due to the full compatibility between criteria commonly considered in conservation priority-setting and the ‘biodiversity criteria’ of the Convention, there is a wealth of readily available information. Tentative List exercises and individual nomination efforts should systematically consider the references used for this assessment.

Multiple sites have emerged as areas deserving further analysis to confirm or reject possible World Heritage merits. While emphasising once more that the role of this assessment is not to endorse specific sites, it is hoped that the following list of candidate sites of potential World Heritage merits contributes to guiding the search. Further analysis is needed in all cases, which will help to better understand World Heritage potential – or lack thereof. The following overview starts with hints at the potential of contiguous and/or serial extensions of existing World Heritage properties, in no particular order, prior to listing hints at potential new sites.

- Khangchendzonga National Park in India is routinely described as a conservation gem with intricate links to several other areas of global conservation importance. From a technical perspective, the most obvious ‘extension candidate’ is the contiguous Kangchenjunga Conservation Area (Nepal). There are many nearby protected areas of highest conservation importance in Bhutan, China, India and Nepal, as detailed in earlier chapters.
- Sagarmatha National Park (Nepal) encompasses part of the world’s highest mountain, a partial coverage following political borders rather than a conservation rationale. From a technical perspective, there is obvious potential for a more meaningful World Heritage coverage of the peak of our planet.
- The boundaries of several components of the Three Parallel Rivers of Yunnan Protected Areas (China) coincide with national and sub-national borders. While already a large and complex serial property, extensions into neighbouring Sichuan, TAR and/or Myanmar deserve analysis from a technical perspective.
- The various properties in China’s Sichuan Province (Jiuzhaigou Valley Scenic and Historic Interest Area, Huanglong Scenic and Historic Interest Area, Sichuan Giant Panda Sanctuaries – Wolong, Mt Siguniang and Jiayin Mountains) are all embedded in much larger landscapes of highest conservation priority and could likely benefit from contiguous or serial extensions; the area may even enable new independent nominations. From a technical perspective, all options deserve further scrutiny.
- Manas Wildlife Sanctuary (India) is the existing property that is most often referenced in the reviewed literature as an integral part of a larger landscape of highest conservation significance. While just on the margin of HKH, the area depends on the HKH, with which it is ecologically, hydrologically and culturally linked. As detailed earlier, the property is today embedded within a large bi-national protected area complex. The contiguous Royal Manas National Park in Bhutan would appear to be an obvious ‘sister park’ deserving further analysis, whereas an independent nomination would seem less promising due to the similarity and coherence with the existing property. The situation has even attracted the attention of the World Heritage Committee, which recommended the extension of the current property into neighbouring Bhutan, while also encouraging extension and consolidation on the Indian side of the border (Decision 35 COM 7A.13, UNESCO/Paris, 2011).
- Chitwan National Park (Nepal) is part of a cluster of protected areas in Nepal and India in the Terai Lowlands sometimes described as the Terai Arc. As both some of the protected areas and the surrounding landscape are partially degraded and highly threatened, reconnecting the various protected areas is the most promising, if not the only, long-term option to maintain viable populations of wide-ranging species, including flagship species of the property, such as rhinos, elephants and tigers. Consequently, a more ambitious World Heritage approach is to be recommended if the property is to maintain its biodiversity values. Potential extensions would have to be further analysed with a focus on integrity.
- Shey Phoksundo National Park and Upper Dolpo in Nepal are a rare case of strong local interest in developing a World Heritage nomination. As the remote area is large, intact and overlapping with recognised conservation priorities, further analysis is recommended.

- Sanjiangyuan on the Tibetan Plateau and the Yaluzangbudaxiagu Nature Reserve within the Eastern Himalayan Broadleaf and Conifer Forests (both China) have been singled out as sites of possible World Heritage calibre in a specific study and as such deserve further analysis. More recently, Sanjiangyuan, literally meaning ‘Source of Three Rivers’ (the Yellow River/Huanghe, Yangtze/Jinsha and Lancang/Mekong). Parts of the area were protected as the Sanjiangyuan National Nature Reserve (SNNR), which became Sanjiangyuan National Park (SNP).
- The Central Karakoram in Pakistan, perhaps including adjacent areas in India and China, has been suggested as a promising candidate site.
- From a desert conservation perspective, Band-E-Amir (Afghanistan) and the Hunza Valley in the Karakoram of Pakistan deserve further consideration.

#### ***Recommendation 6***

**Systematically consider all hints at candidate sites for new nominations and/or contiguous and/or serial extensions of existing properties.**

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### 7.4 Useful links

#### Global

<https://dopa-explorer.jrc.ec.europa.eu/>

Digital Observatory for Protected Areas, a web-based information system of the European Commission's Joint Research Centre on the world's protected areas.

<https://irreplaceability.cefe.cnrs.fr/about>

Protected area irreplaceability data (Le Saout et al., 2013).

<https://www.cepf.net/>

Homepage of the Critical Ecosystem Partnership Fund (CEPF), a joint initiative of l'Agence Française de Développement, Conservation International, the European Union, the Global Environment Facility, the Government of Japan and the World Bank dedicated to the world's biodiversity hotspots.

<https://www.cepf.net/our-work/biodiversity-hotspots>

Access to a wealth of information on the world's biodiversity hotspots, including the four considered in this assessment. Note in particular the ecosystem profiles for each hotspot which can be downloaded free of charge, often in several languages.

<http://www.intactforests.org/>

Access to useful information on Intact Forest Landscapes (IFL), including global maps. Link to an overview layer in Google Earth. GIS data in ESRI SHAPE format is available for download.

<http://www.keybiodiversityareas.org/home>

Homepage of the World Database of Key Biodiversity Areas™, managed by BirdLife International on behalf of the KBA Partnership, which brings together several of the world's leading conservation organisations.

<https://www.birdlife.org/worldwide/programme-additional-info/important-bird-and-biodiversity-areas-ibas>

Access to Birdlife International's work on Important Bird and Biodiversity Areas (IBAs), including information on some 13,000 IBAs at the time of writing. The numerous search functions include searches by country and species, see:

<http://datazone.birdlife.org/home>

<http://datazone.birdlife.org/country>

<http://datazone.birdlife.org/species/search>

<http://datazone.birdlife.org/eba>

Access to BirdLife International's searchable database on the Endemic Bird Areas (EBAs) of the world.

<https://ecoregions2017.appspot.com/>

Online mapping tool providing access to a wealth of mapped layers and other information on the world's terrestrial ecoregions.

<https://www.feow.org/>

Online source of information on the Freshwater Ecoregions of the World.

<https://www.millenniumassessment.org/>

The Millennium Ecosystem Assessment (MA) was a major global stock-taking exercise to assess the consequences of ecosystem change for human well-being and the scientific basis for action needed to enhance the conservation and sustainable use of those systems and their contribution to human well-being. More than a decade after its publication it continues to serve as a most helpful source to appreciate the linkages between biodiversity, ecosystem services and human well-being.

[www.teebweb.org](http://www.teebweb.org)

In a nutshell, the Economics of Ecosystems and Biodiversity (TEEB) has the objective to “make nature's values visible” and to mainstream the values of biodiversity and ecosystem services into decision-making at all levels.

<https://ipbes.net>

The Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) is an independent intergovernmental body with the objective to strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long-term human well-being and sustainable development.

<https://www.unep-wcmc.org/resources-and-data/centres-of-plant-diversity> Dataset provides spatial representation for the 234 Data Sheet Sites in the Centres of Plant Diversity (Davis & Heywood, 1994–1997).

## Regional

<https://www.earthobservatory.nasa.gov/features/8000MeterPeaks>

Introduction to the world's 14 peaks exceeding 8,000 m a.s.l. by NASA.

<http://www.icimod.org>

Homepage of the International Centre for Integrated Mountain Development (ICIMOD), a regional intergovernmental learning and knowledge sharing centre serving the eight regional member countries of the Hindu Kush Himalaya – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan – and based in Kathmandu, Nepal. One of the richest sources of information on the HKH.

<http://lib.icimod.org/record/34640>

Access to the full text of the workshop proceedings *Leveraging the World Heritage Convention for transboundary conservation in the Hindu Kush Himalaya, 30–31 May 2019, Kathmandu, Nepal: ICIMOD Proceedings (2019)*.

<http://www.icimod.org/?q=9121>

Helpful descriptions of ICIMOD's various Transboundary Landscapes and corresponding initiatives.

<https://link.springer.com/book/10.1007/978-3-319-92288-1>

Access to the full text of the ICIMOD flagship publication *Hindu Kush Himalaya Assessment. Mountains, Climate Change, Sustainability and People*. DOI <https://doi.org/10.1007/978-3-319-92288-1>

<https://www.grida.no/resources/12807>

Maps and graphics from the Outlook on Climate Change Adaptation in the Hindu Kush Himalaya by UN Environment – GRID Arendal.

**By country** (introductory information offered by the World Heritage Centre and the Convention on Biological Diversity. When applicable, additional online sources are provided).

## Afghanistan

<https://whc.unesco.org/en/statesparties/af>

<https://www.cbd.int/countries/?country=af>

## Bangladesh

<https://whc.unesco.org/en/statesparties/bd>

<https://www.cbd.int/countries/?country=bd>

## Bhutan

<https://whc.unesco.org/en/statesparties/bt>

<https://www.cbd.int/countries/profile/default.shtml?country=bt>

<http://www.rspnbhutan.org/>

<http://www.rspnbhutan.org/protected-areas-of-bhutan/>

## China

<https://whc.unesco.org/en/statesparties/cn>

<https://www.cbd.int/countries/?country=cn>

## India

<https://whc.unesco.org/en/statesparties/in>

<https://www.cbd.int/countries/?country=in>

<https://www.wii.gov.in/>

<http://www.sikenvis.nic.in/>

<https://greathimalayannationalpark.com/>

### Myanmar

<https://whc.unesco.org/en/statesparties/mm>

<https://www.cbd.int/countries/default.shtml?country=mm>

### Nepal

<https://whc.unesco.org/en/statesparties/np>

<https://www.cbd.int/countries/profile/default.shtml?country=np>

### Pakistan

<https://whc.unesco.org/en/statesparties/pk>

<https://www.cbd.int/countries/?country=pk>

<http://www.cknp.org/cms/>

### Tajikistan

<https://whc.unesco.org/en/statesparties/tj>

<https://www.cbd.int/countries/?country=tj>

### Key institutional World Heritage actors

#### UNESCO

<http://whc.unesco.org/>

Homepage of the World Heritage Centre at UNESCO Headquarters, the Secretariat of the World Heritage Convention, see also:

<http://whc.unesco.org/en/list/>

<https://whc.unesco.org/en/tentativelists/>

<https://whc.unesco.org/en/guidelines/>

<https://whc.unesco.org/en/criteria/>

<https://whc.unesco.org/en/resources/>

<https://whc.unesco.org/en/preparing-world-heritage-nominations/>

#### IUCN

<https://www.iucn.org>

Homepage of the International Union for Conservation of Nature, a membership-based union composed of both government and civil society organisations – and one of three official Advisory Bodies to the World Heritage Committee, along with ICOMOS and ICCROM. Particularly relevant sections for the purpose of this assessment include:

<https://www.iucn.org/regions/asia>

<https://www.iucn.org/theme/world-heritage>

<https://www.iucn.org/theme/world-heritage/resources>

<https://www.iucn.org/theme/world-heritage/resources/publications>

<https://www.iucn.org/theme/world-heritage/resources/iucn-policies-world-heritage>

#### ICOMOS

<https://www.icomos.org>

Homepage of the International Council on Monuments and Sites, one of three official Advisory Bodies to the World Heritage Committee, along with IUCN and ICCROM.

#### ICCROM

<https://www.iccrom.org>

Homepage of the International Centre for the Study of the Preservation and Restoration of Cultural Property, one of three official Advisory Bodies to the World Heritage Committee, along with IUCN and ICOMOS.



## 8. Annexes

### 8.1 List of workshop participants

Participants are listed in alphabetical order by country. See ICIMOD (2019a) for a more detailed list, including contact details.

Name	Affiliation and country
Ms Farhana Yasmin Jahan	Bangladesh National Commission for UNESCO (BNCU), Ministry of Education / Bangladesh
Dr Hafeza Akther	BNCU, Ministry of Education / Bangladesh
Ms Wangchuk Bidha	Bhutan National Commission for UNESCO, Ministry of Education / Bhutan
Ms Tshering Pem	Nature Conservation Division, Ministry of Agriculture and Forests / Bhutan
Prof Li Maobiao	Yunnan Academy of Biodiversity, Southwest Forestry University, Kunming, Yunnan Province / China
Prof Dr Yang Cuibai	School of Law, Institute of South Asia Studies, Sichuan University / China
Ms Zhang Jingqiu	International Training and Communication Department, ICOMOS International Conservation Center – Xi'an / China
Mr Tilman Jaeger	IUCN World Heritage Programme (Advisor) / Germany
Mr Vivek Saxena	IUCN India Country Office / India
Dr G.C.S. Negi	G.B. Pant National Institute of Himalayan Environment and Sustainable Development (GBPNIHESD) / India
Dr Rajesh Joshi	Sikkim Regional Centre of GBPNIHESD / India
Dr Wishfully Myllemngap	GBPNIHESD / India
Dr Manoj V. Nair	UNESCO Category 2 Centre for World Natural Heritage Management & Training (Asia-Pacific), Wildlife Institute of India (WII) / India
Mr Thein Htay	Nature and Wildlife Conservation Division, Forest Department, Ministry of Natural Resources and Environmental Conservation / Myanmar
Hon. Mr Chhakka Bahadur Lama	Member of Parliament (Humla) / Nepal
Mr Khaga Raj Paudyal	Ministry of Education, Science and Technology, Nepal National Commission for UNESCO / Nepal
Dr Sindhu Prasad Dhungana	Planning, Monitoring and Coordination Division, Ministry of Forests and Environment / Nepal
Dr Suresh Sura Shrestha	Department of Archaeology, World Heritage Conservation Section, focal point for Cultural World Heritage of Nepal and Silk Road Activities in Nepal / Nepal
Ms Shradda Sigdel	Ministry of Forests and Environment / Nepal
Prof Dr Rameshwar Adhikari	Research Centre for Applied Science and Technology (RECAST) / Nepal
Emeritus Prof Dr Ram Prasad Chaudhary	Man and Biosphere Reserve Committee / Nepal
Dr Prahlad Kumar Thapa	IUCN / Nepal
Mr Christian Manhart	United Nations Educational, Scientific and Cultural Organization (UNESCO) Nepal / Nepal
Mr Kai Weise	International Council on Monuments and Sites (ICOMOS) Nepal / Nepal
Ms Anie Joshi	ICOMOS Nepal / Nepal
Ms Carolle Alarcon Eichmann	UNESCO Nepal / Nepal
Mr Mehrob Qozibekov	Zurkul National Park, Tajikistan
Dr Sandra Elvin	National Geographic Society / USA
Mr. Cyril Kormos	Wild Heritage / USA

**ICIMOD staff**

Dr David Molden	Director General
Dr Eklabya Sharma	Deputy Director General
Prof Dr Ruijun Long	Theme Leader – Ecosystem Services
Mr Brij MS Rathore	Chief Policy Advisor – NRM
Dr Rajan Kotru	Regional Programme Manager – TBL
Dr Laurie Ann Vasily	Head – Knowledge Management and Communication/Senior KM Specialist
Dr Nakul Chettri	Programme Coordinator – KLCDI
Dr Yi Shaoling	Programme Coordinator – Hi-LIFE
Ms Amy Elizabeth Sellmyer	Creative Communication – Multi Media Specialist
Mr Farid Ahmad	Head – Strategic Planning, Monitoring and Evaluation Unit
Dr Janita Gurung	Programme Coordinator – KSLCDI
Mr Ghulam Ali	Programme Coordinator – HKPL
Dr Anu Lama	Tourism Specialist
Mr Muhammad Ismail	Pakistan Coordinator – HKPL
Dr Srijana Joshi Rijal	Ecosystem Specialist
Mr Kabir Uddin	Geospatial Specialist
Dr Sunita Chaudhary	Consultant
Mr Kamal Aryal	NRM Analyst
Mr Basant Pant	Programme Officer
Ms Rekha Rasaily	Programme Associate
Ms Himaa Rai	Programme Associate
Ms Sunayana Basnet	SSA

**8.2 Additional experts consulted**

Listed in alphabetical order.

<b>Name</b>	<b>Affiliation</b>
Mr Alessandro Balsamo	Chief of Unit, Nominations, World Heritage Centre, UNESCO
Mr Bastian Bertzky	Scientific Project Officer, European Commission Joint Research Centre, and Science Adviser to the IUCN World Heritage Programme
Ms Mizuki Murai	World Heritage Conservation Officer, IUCN World Heritage Programme
Mr Remco van Merm	Species Conservation Grants Coordinator at IUCN
Mr Kai Windhorst	Chief Technical Adviser, GIZ Nepal

### 8.3 The World Heritage criteria

**Source:** Excerpts from Paragraph 77 of the Operational Guidelines for the Implementation of the World Heritage Convention, 2019 version (<http://whc.unesco.org/en/guidelines/>). See paragraphs 49–53 for more detailed guidance on OUV. Natural World Heritage criteria highlighted in bold.

The Committee considers a property as having Outstanding Universal Value if the property meets one or more of the following criteria. Nominated properties shall therefore:

- (i) represent a masterpiece of human creative genius;
- (ii) exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design;
- (iii) bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared;
- (iv) be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history;
- (v) be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change;
- (vi) be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria);
- (vii) **to contain superlative natural phenomena or areas of exceptional natural beauty and aesthetic importance;**
- (viii) **to be outstanding examples representing major stages of Earth's history, including the record of life, significant on-going geological processes in the development of landforms, or significant geomorphic or physiographic features;**
- (ix) **to be outstanding examples representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals;**
- (x) **to contain the most important and significant natural habitats for in-situ conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation.**



## 8.4 List of ecoregions within HKH, including the Global 200

Ecoregions and area. Global 200 ecoregions are highlighted in bold. Source: Chettri et al. (2008) based on Olson and Dinerstein (2002) and Olson et al. (2001 and 2000). Information in brackets naming corresponding realm and additional column naming biome type added by author based on Olson and Dinerstein (2002) and Olson et al. (2001 and 2000). Where applicable, numbers in brackets show the number of existing natural, cultural or mixed World Heritage properties by ecoregion totalling 17. Note that Global 200 priority ecoregions can encompass more than one ecoregion. This added complexity was not considered for the purpose of this simplified overview.

#	Name (realm*)	Biome type	Area (km <sup>2</sup> )
1	Afghan mountains semi-desert (PA, 2)	Deserts and xeric shrublands	13,413.7
2	Badghyz and Karabil semi-desert (PA)	Deserts and xeric shrublands	46,402.7
3	Baluchistan xeric woodlands (PA, 1)	Deserts and xeric shrublands	240,560.2
4	Brahmaputra Valley semi-evergreen forests (IM)	Tropical and subtropical moist broadleaf forests	4,651.1
5	Central Afghan mountains xeric woodlands (PA)	Deserts and xeric shrublands	83,273.6
6	<b>Central Indochina dry forests (IM)</b>	<b>Tropical and subtropical dry broadleaf forests</b>	<b>13.3</b>
7	<b>Central Tibetan Plateau alpine steppe (PA, 1)</b>	<b>Montane grasslands and shrublands</b>	<b>629,473.1</b>
8	<b>Chin Hills-Arakan Yoma montane forests (IM)</b>	<b>Tropical and subtropical moist broadleaf forests</b>	<b>26,381.4</b>
9	<b>Daba Mountains evergreen forests (PA)</b>	<b>Temperate broadleaf and mixed forests</b>	<b>194.4</b>
10	East Afghan montane conifer forests (PA)	Temperate coniferous forests	19,651.4
11	<b>Eastern Himalayan alpine shrub and meadows (PA)</b>	<b>Montane grasslands and shrublands</b>	<b>121,184.9</b>
12	<b>Eastern Himalayan broadleaf forests (IM, 1)</b>	<b>Temperate broadleaf and mixed forests</b>	<b>81,286.8</b>
13	<b>Eastern Himalayan subalpine conifer forests (IM)</b>	<b>Temperate coniferous forests</b>	<b>27,478.2</b>
14	Ghorat-Hazarajat alpine meadow (PA)	Montane grasslands and shrublands	62,515.4
15	<b>Gissaro-Alai open woodlands (PA)</b>	<b>Temperate grasslands, savannas and shrublands</b>	<b>3,613.5</b>
16	Guizhou Plateau broadleaf and mixed forests (PA)	Tropical and subtropical moist broadleaf forests	101.8
17	<b>Hengduan Mountains subalpine conifer forests (PA)</b>	<b>Temperate coniferous forests</b>	<b>99,418.5</b>
18	Himalayan subtropical broadleaf forests (IM, 2)	Tropical and subtropical moist broadleaf forests	31,902.8
19	Himalayan subtropical pine forests (IM)	Tropical and subtropical moist broadleaf forests	73,632.0
20	<b>Hindu Kush alpine meadow (PA)</b>	<b>Montane grasslands and shrublands</b>	<b>28,259.2</b>
21	Irrawaddy dry forests (IM)	Tropical and subtropical dry broadleaf forests	356.2
22	Irrawaddy freshwater swamp forests (IM)	Tropical and subtropical dry broadleaf forests	753.6
23	Irrawaddy moist deciduous forests (IM)	Tropical and subtropical dry broadleaf forests	14,751.8
24	<b>Karakoram-West Tibetan Plateau alpine steppe (PA)</b>	<b>Montane grasslands and shrublands</b>	<b>135,245.9</b>
25	<b>Kayah-Karen montane rain forests (IM)</b>	<b>Tropical and subtropical dry broadleaf forests</b>	<b>22,997.6</b>
26	Kuh Rud and Eastern Iran montane woodlands (PA)	Montane grasslands and shrublands	2063.0
27	Lower Gangetic Plains moist deciduous forests (IM)	Tropical and subtropical moist broadleaf forests	17,385.1
28	<b>Meghalaya subtropical forests (IM)</b>	<b>Tropical and subtropical moist broadleaf forests</b>	<b>28,580.4</b>
29	<b>Mizoram-Manipur-Kachin rain forests (IM)</b>	<b>Tropical and subtropical moist broadleaf forests</b>	<b>99,556.2</b>
30	Myanmar coastal mangroves (IM)	Mangrove	5,101.9

#	Name (realm*)	Biome type	Area (km <sup>2</sup> )
31	Myanmar coastal rain forests (IM)	Tropical and subtropical moist broadleaf forests	23,632.7
32	North Tibetan Plateau-Kunlun Mountains alpine desert (PA)	Montane grasslands and shrublands	176,938.9
33	<b>Northeast India-Myanmar pine forests (IM)</b>	<b>Tropical and subtropical coniferous forests</b>	<b>9,556.2</b>
34	<b>Northeastern Himalayan subalpine conifer forests (PA)</b>	<b>Temperate coniferous forests</b>	<b>46,277.3</b>
35	<b>Northern Indochina subtropical forests (IM)</b>	<b>Tropical and subtropical moist broadleaf forests</b>	<b>173,488.8</b>
36	<b>Northern Triangle subtropical forests (IM)</b>	<b>Tropical and subtropical moist broadleaf forests</b>	<b>46,495.3</b>
37	<b>Northern Triangle temperate forests (IM)</b>	<b>Temperate broadleaf and mixed forests</b>	<b>6,501.8</b>
38	Northwestern Himalayan alpine shrub and meadows (PA, 1)	Montane grasslands and shrublands	49,404.1
39	Northwestern thorn scrub forests (IM)	Deserts and xeric shrublands	32,307.7
40	<b>Nujiang Langcang Gorge alpine conifer and mixed forests (PA, 2)</b>	<b>Temperate coniferous forests</b>	<b>82,807.4</b>
41	Pamir alpine desert and tundra (PA)	Montane grasslands and shrublands	4,997.2
42	Paropamisus xeric woodlands (PA)	Deserts and xeric shrublands	90,544.6
43	Qaidam Basin semi-desert (PA)	Deserts and xeric shrublands	165,645.2
44	Qilian Mountains conifer forests (PA)	Temperate coniferous forests	13,069.5
45	Qilian Mountains subalpine meadows (PA)	Montane grasslands and shrublands	39,492.9
46	<b>Qin Ling Mountains deciduous forests (PA)</b>	<b>Temperate broadleaf and mixed forests</b>	<b>6,013.8</b>
47	<b>Qionglai-Minshan conifer forests (PA, 1)</b>	<b>Temperate coniferous forests</b>	<b>63,220.1</b>
48	Registan-North Pakistan sandy desert (PA)	Deserts and xeric shrublands	70,334.8
49	Rock and ice (n/a, 3)	n/a	88,963.5
50	<b>Southeast Tibet shrub and meadows (PA, 2)</b>	<b>Montane grasslands and shrublands</b>	<b>425,853.2</b>
51	Sulaiman Range alpine meadows (PA)	Montane grasslands and shrublands	21,651.2
52	Taklimakan desert (PA)	Deserts and xeric shrublands	790.5
53	<b>Terai-Duar savanna and grasslands (PA)</b>	<b>Tropical and subtropical grasslands, savannas and shrublands</b>	<b>26,531.1</b>
54	<b>Tibetan Plateau alpine shrublands and meadows (PA)</b>	<b>Montane grasslands and shrublands</b>	<b>272,131.2</b>
55	Upper Gangetic Plains moist deciduous forests (IM)	Tropical and subtropical moist broadleaf forests	4,274.8
56	Western Himalayan alpine shrub and meadows (IM)	Alpine shrub and meadows	70,162.5
57	<b>Western Himalayan broadleaf forests (IM)</b>	<b>Temperate broadleaf and mixed forests</b>	<b>55,147.8</b>
58	<b>Western Himalayan subalpine conifer forests (IM)</b>	<b>Temperate coniferous forests</b>	<b>30,831.3</b>
59	<b>Yarlung Tsangpo arid steppe (PA, 1)</b>	<b>Montane grasslands and shrublands</b>	<b>59,457.9</b>
60	<b>Yunnan Plateau subtropical evergreen forests (PA)</b>	<b>Tropical and subtropical moist broadleaf forests</b>	<b>93,354.3</b>

\* PA: Palearctic; IM: Indomalayan

## 8.5 IUCN fossil site evaluation checklist

Sources: Wells (1996), see also Earth's Geological History – A contextual Framework, Dingwall et al. (2005).

1. Does the site provide fossils which cover an extended period of geological time: i.e. how wide is the geological window?
2. Does the site provide specimens of a limited number of species or whole biotic assemblages: i.e. how rich is the species diversity?
3. How unique is the site in yielding fossil specimens for that particular period of geological time: i.e. would this be the 'type locality' for study or are there similar areas that are alternatives?
4. Are there comparable sites elsewhere that contribute to the understanding of the total 'story' of that point in time/space: i.e. is a single site nomination sufficient or should a serial nomination be considered?
5. Is the site the only main location where major scientific advances were (or are) being made that have made a substantial contribution to the understanding of life on Earth?
6. What are the prospects for ongoing discoveries at the site?
7. How international is the level of interest in the site?
8. Are there other features of natural value (e.g. scenery, landform and vegetation) associated with the site: i.e. does there exist within the adjacent area modern geological or biological processes that relate to the fossil resource?
9. What is the state of preservation of specimens yielded from the site?
10. Do the fossils yielded provide an understanding of the conservation status of contemporary taxa and/or communities: i.e. how relevant is the site in documenting the consequences to modern biota of gradual change through time?

## 8.6 Recommendations for World Heritage fossil site nominations

Source: Wells (1996).

### **Recommendation 1**

Choose sites that contain well-preserved fossil accumulations of high species diversity, which in combination best document the story of community and environmental change through time.

### **Recommendation 2**

The 'events' to be represented in the history of life should, where possible, encompass the iconography of a tree of life not a ladder of progress.

### **Recommendation 3**

Choose fossil Lagerstätten and make provision for expanding the List or substituting sites/fossils to better tell any chapter of the story.

### **Recommendation 4**

- (i) Separate Precambrian history from Phanerozoic history (the roots from the upper branches of the evolutionary tree respectively),
- (ii) Present Precambrian history as major events, such as the origin of life, multicellularity, etc. and
- (iii) Present Phanerozoic history in terms of communities and/or stages in the evolution of major groups.

### **Recommendation 5**

All published Precambrian fossil sites should be reviewed by an expert panel to select those worthy of evaluation for Heritage listing. This may be best achieved through a panel drawn from the international palaeontological societies.

### **Recommendation 6**

Phanerozoic sites should be chosen so as to be representative in time and space of both community structure and selected phylogenetic lineages.

### **Recommendation 7**

Any fossil Lagerstätten chosen from the Phanerozoic should wherever possible be of high diversity and include significant invertebrate as well as vertebrate assemblages.

### **Recommendation 8**

A condition for granting World Heritage status should include provision for curation, study and display of any site/fossils.

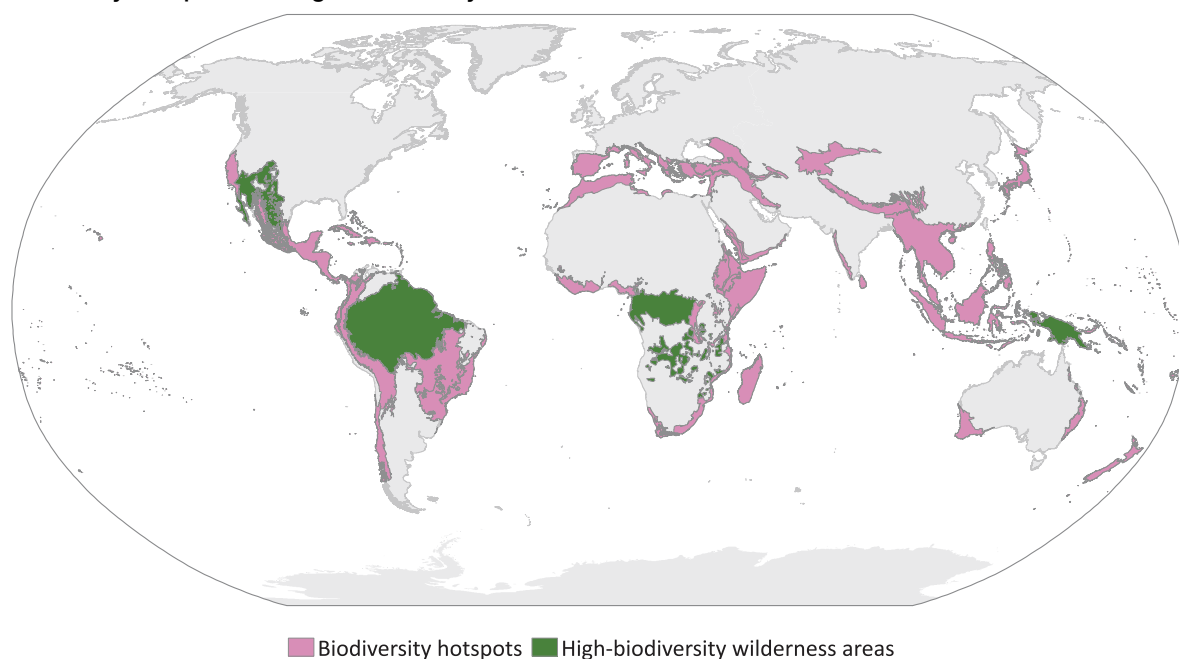
### **Recommendation 9**

Specialists in the major Phanerozoic groups and time periods should be consulted to refine and update the indicative list. This may be best achieved through a panel drawn from the international palaeontological societies.



## 8.7 Maps

### 8.7.1 Biodiversity Hotspots and High-Biodiversity Wilderness Areas

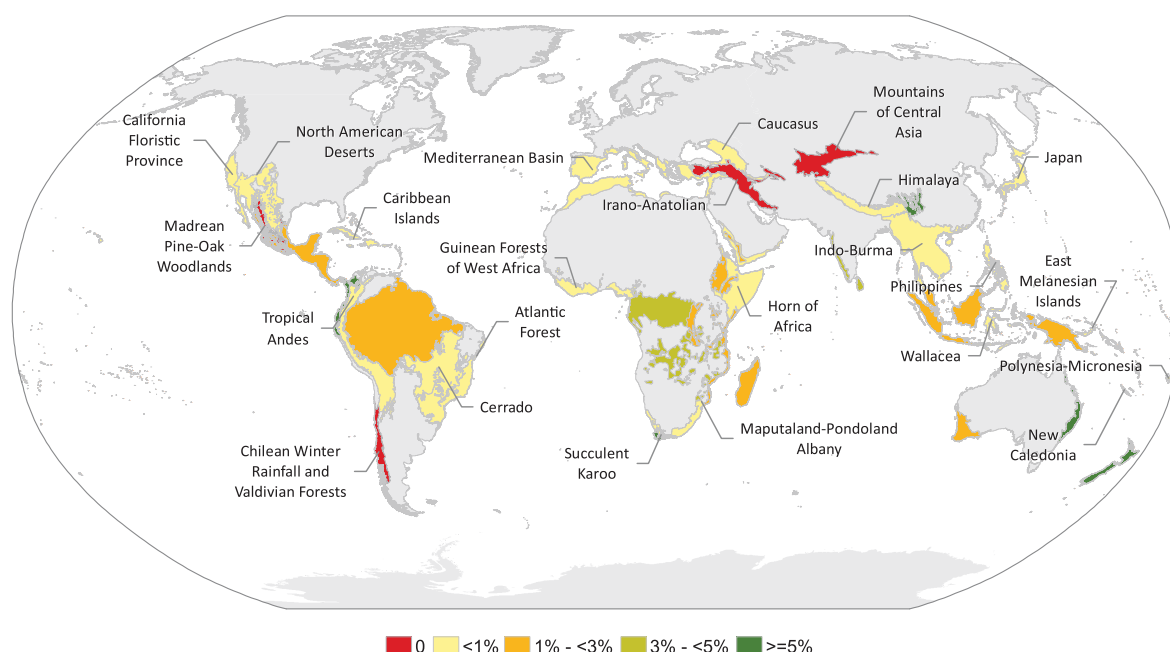


**Figure 3.6** Biodiversity hotspots (35 areas that hold  $\geq 0.5\%$  of the world's plants as endemics and have already lost  $\geq 70\%$  of their primary vegetation) and high-biodiversity wilderness areas (five areas that hold  $\geq 0.5\%$  of the world's plants as endemics, retain  $\geq 70\%$  of their primary vegetation and are sparsely populated) of the world (Mittermeier *et al.* 2002 and 2004, Williams *et al.* 2011).

Source: Bertzky *et al.* (2013)

While not relevant to this assessment, it should be noted that a 36<sup>th</sup> hotspot was recently identified.

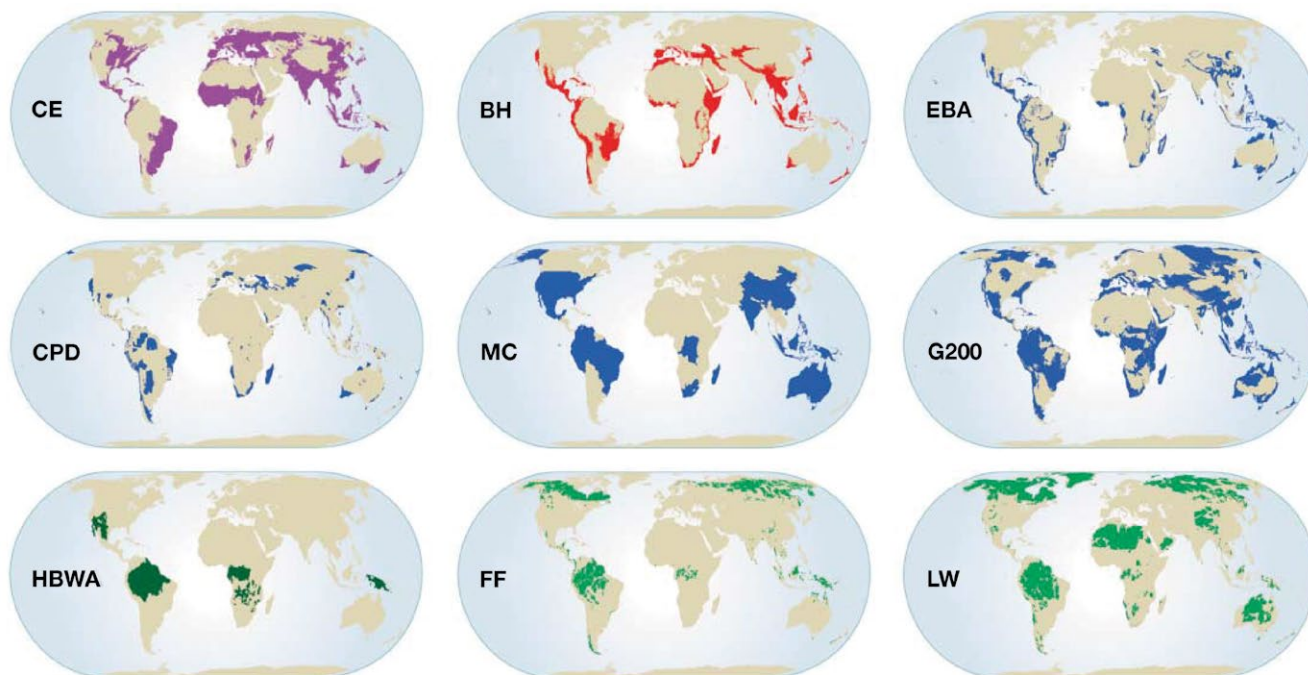
### 8.7.2 Existing 'biodiversity' properties, Biodiversity Hotspots and High-Biodiversity Wilderness Areas



**Figure 3.7** Percentage area coverage of biodiversity World Heritage sites in biodiversity hotspots and high-biodiversity wilderness areas (HBWAs). Hotspots and HBWAs with no (red) or less than 1% (yellow) of their total area in biodiversity World Heritage sites are labelled.

Source: Bertzky *et al.* (2013); considering criteria (ix) and/or (x) only.

### 8.7.3 Maps of the nine global biodiversity conservation templates

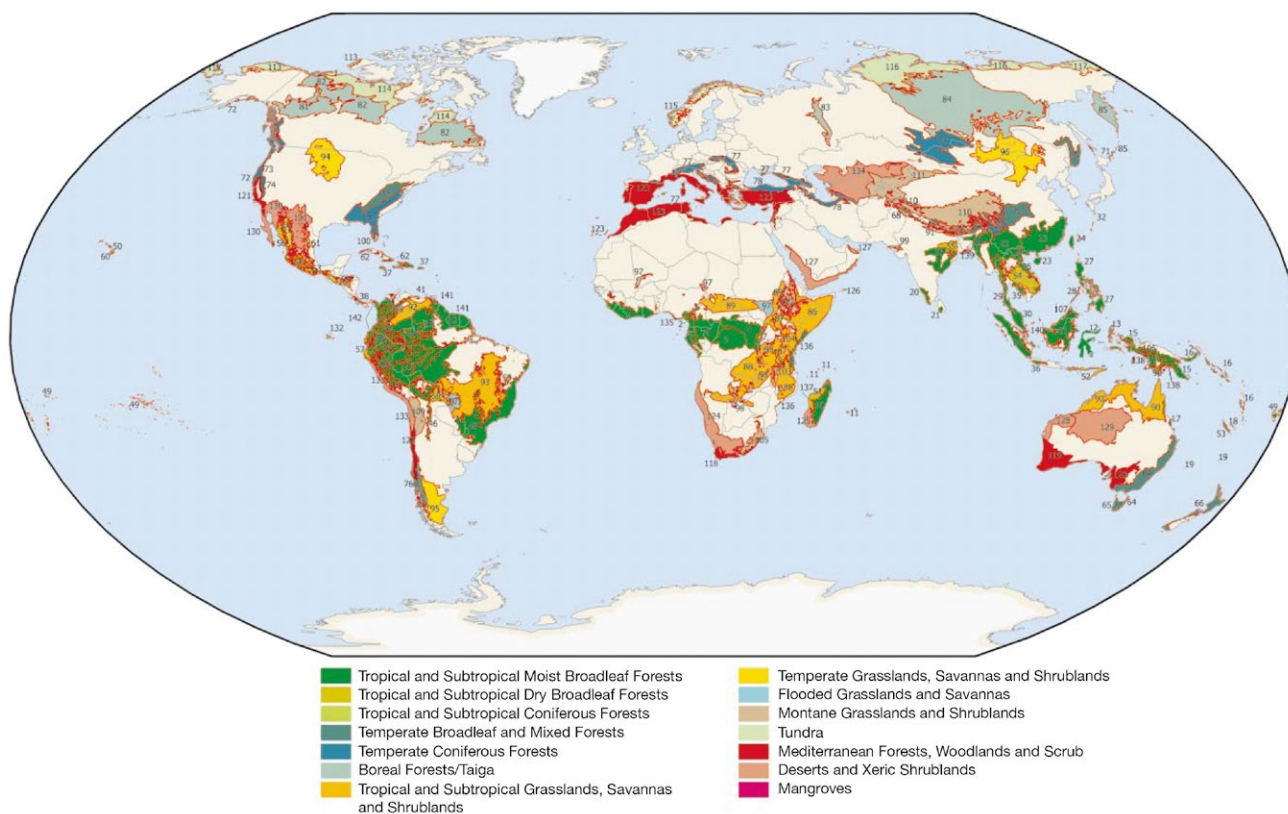


**Fig. 2.** Maps of the nine global biodiversity conservation priority templates: CE, crisis ecoregions (21); BH, biodiversity hot spots [(11), updated by (39)]; EBA, endemic bird areas (15); CPD, centers of plant diversity (12); MC, megadiversity countries (13); G200, global 200 ecoregions [(16), updated by (54)]; HBWA, high-biodiversity wilderness areas (14); FF, frontier forests (19); LW, last of the wild (20).

Source: Brooks et al. (2006)

### 8.7.4 The terrestrial Global 200 ecoregions

Ecoregions selected according to outstanding biodiversity features and representative value.



**Figure 2.** The terrestrial Global 200 ecoregions targets ecoregion with outstanding biodiversity features and representative value. The numbers correspond to the ecoregions listed in Table 1.

Source: Olson et al. (2000)

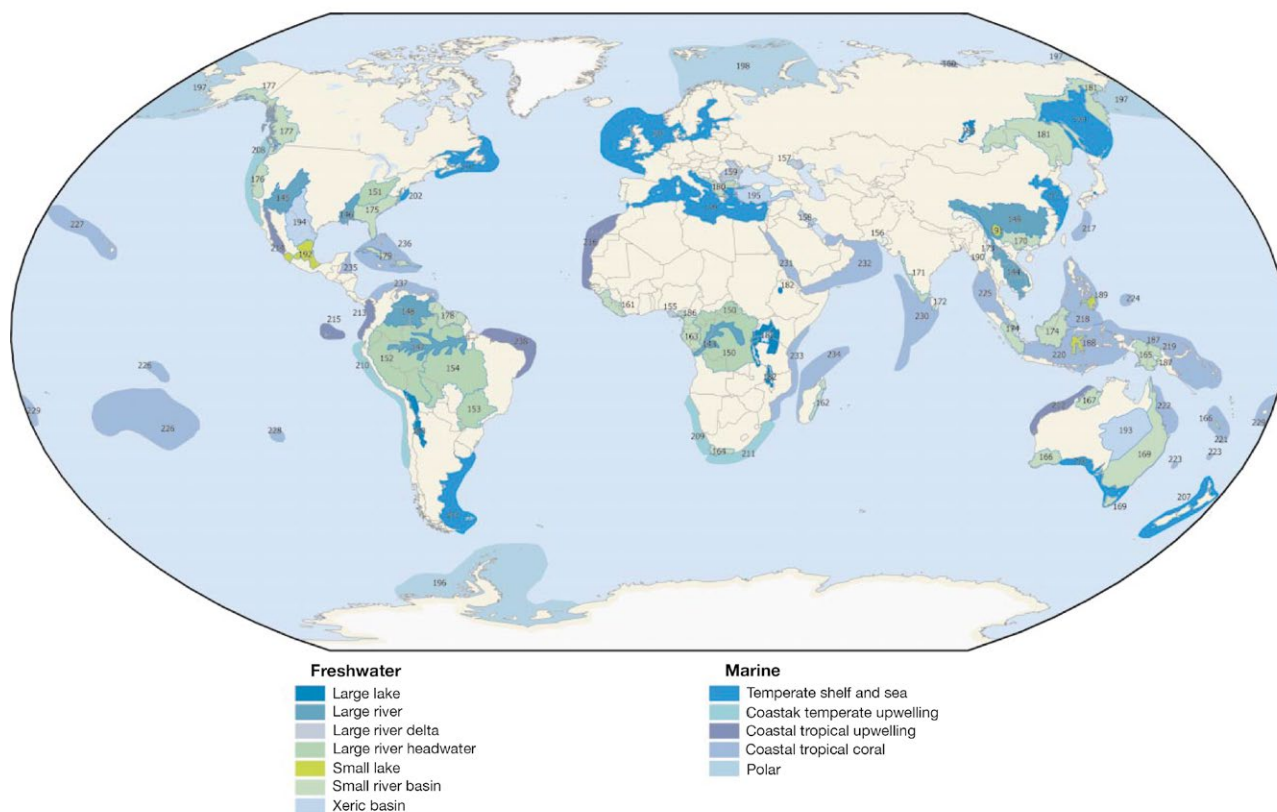
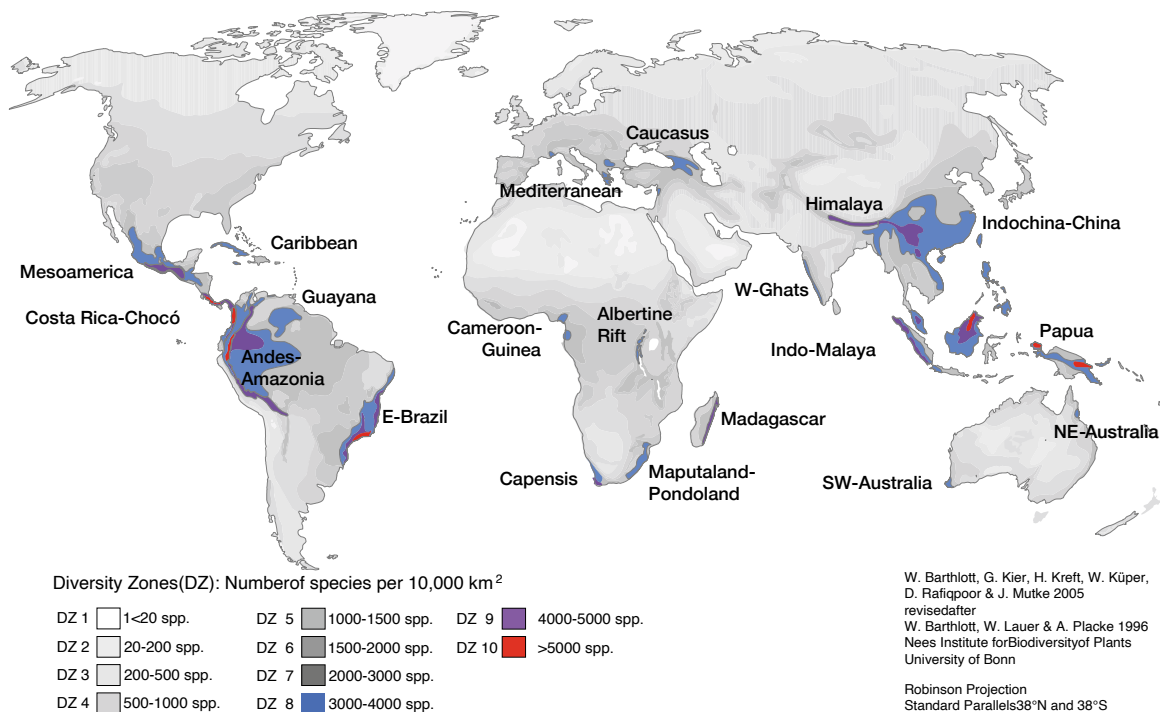
8.7.5 The freshwater and marine *Global 200* ecoregions

Figure 3. The freshwater and marine Global 200 ecoregions. The numbers correspond to the ecoregions listed in Table 1.

Source: Olson et al. (2000)

## 8.7.6 Global map of species richness of vascular plants

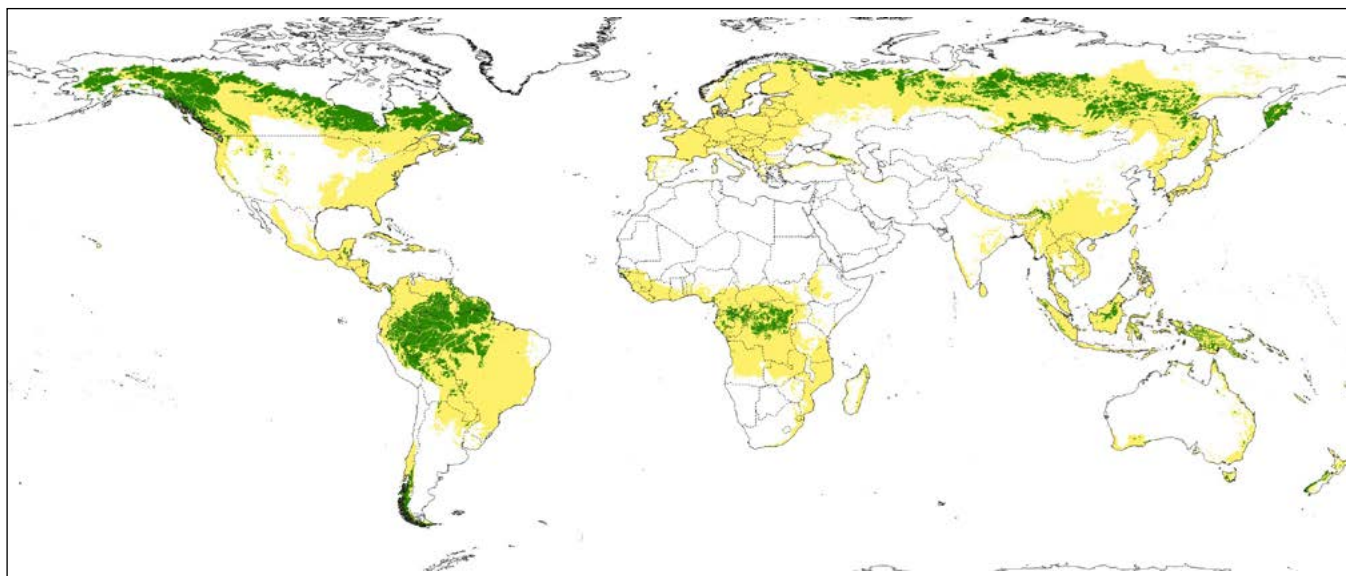


**Fig. 5.1** Global map of species richness of vascular plants highlighting the 20 centres of highest species richness (after Barthlott et al. 2005; Mutke and Barthlott 2005)

Source: Mutke et al. (2011)



### 8.7.7 The world's *Intact Forests Landscapes*



The world's Intact Forest Landscapes (IFLs) are shown in green colour. Yellow colour shows forest zone outside IFLs.

Source: Potapov et al. (2008)





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